DOCUMENT RESUME

ED 472 223 IR 058 523

TITLE	Measures for Electronic Resources (E-Metrics). Complete Set.
INSTITUTION	Association of Research Libraries, Washington, DC.
ISBN	ISBN-0-918006-94-5
PUB DATE	2002-00-00
NOTE	498p.; Includes a CD-ROM (not available from ERIC) titled "E-Metrics Instructional Modules" containing the following four PowerPoint presentations: The ARL New Measures Initiative--The E-Metrics Project: The Importance of Network Measures and Statistics; Preparing YOUR Library to Collect, Report, Analyze, and Use the Statistics and Measures; Recommended Statistics and Measures for Library Networked Services; and The ARL E-Metrics Instructional Modules.
AVAILABLE FROM	Association of Research Libraries, 21 Dupont Circle, NW, Suite 800, Washington, D.C. 20036 ($100 for all five parts; $25 for each individual part). Tel: 202-296-2296; Fax: 202-872-0884; e-mail: pubs@arl.org; Web site: http://www.arl.org/stats/newmeas/emetrics/index.html.
PUB TYPE	Collected Works - General (020)
EDRS PRICE	EDRS Price MF02/PC20 Plus Postage.
DESCRIPTORS	Academic Libraries; *Data Collection; Evaluation Criteria; Evaluation Methods; Higher Education; Information Technology; Library Collections; Library Development; *Measurement Techniques; *Nonprint Media; *Research Libraries; *Statistical Data
IDENTIFIERS	*Association of Research Libraries; *Electronic Resources

ABSTRACT

The Association of Research Libraries (ARL) E-Metrics study was designed as an 18-month project in three phases: an inventory of what libraries were already doing about data collection for electronic resources and an identification of any libraries that could provide best practice; identifying and testing data elements that could be collected and used as measures for electronic resources for both trends and benchmarking; and linking the use of electronic resources to institutional outcomes. Part 1 of this publication contains the background of the project and the report from Phase One, which documents an analysis of current practice among ARL member libraries regarding the collection of information on electronic resources. Part 2 contains the report from Phase Two, which documents the process by which a set of measures was field-tested by project participants, the project investigators' and participants' work with vendor statistics, and the resulting recommendations from the project investigators about which statistics and measures should be collected. Part 2 also includes a compilation of results from the E-Metrics vendor statistics field test. Part 3 provides an instructional module for institutions to use to train their staff to collect the statistics and measures recommended by the investigators, and Part 4 is the data collection manual for the recommended statistics and measures. Part 5 includes two papers regarding the linkage of measures to institutional outcomes, one by the project investigators and another, a commissioned paper on the analysis of accreditation standards of higher education commissions. An appendix presents a comparison of documents that currently have a separate standard for libraries and information sources

Reproductions supplied by EDRS are the best that can be made
from the original document.

with those that do not. Includes a CD-ROM containing the E-Metrics instructional modules in PowerPoint. (AEF)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ASSOCIATION OF RESEARCH LIBRARIES

ED 472 223

MEASURES FOR ELECTRONIC RESOURCES (E-METRICS)

COMPLETE SET

IR058523

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

L.A. George

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

ASSOCIATION OF RESEARCH LIBRARIES
WASHINGTON, D.C.
2002

MEASURES FOR ELECTRONIC RESOURCES (E-METRICS)

COMPLETE SET

Measures for Electronic Resources (E-Metrics) is published by the

Association of Research Libraries
21 Dupont Circle, NW, Suite 800
Washington, D.C. 20036
Telephone: (202) 296-2296
FAX: (202) 872-0884
email: pubs@arl.org

ISBN 0-918006-94-5

© Copyright Notice

The compilation is copyrighted by the Association of Research Libraries. Blanket permission is granted to reproduce and distribute copies of this work for nonprofit, educational, or library purposes, provided that the author, source, and copyright notice are included on each copy. This permission is in addition to rights of reproduction granted under Sections 107, 108, and other provisions of the U.S. Copyright Act.

∞ *The paper used in this publication meets the minimum requirements of ANSI Z39.48-1992(R1997) Permanence of Paper for Publications and Documents in Libraries and Archives.*

Measures for Electronic Resources (E-Metrics)
Complete Set

Table of Contents

Preface

Part 1. Project Background and Phase One Report

E-Metrics: Measures for Electronic Resources
    Rush Miller and Sherrie Schmidt

Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources for ARL Libraries: Study Proposal
    Charles R. McClure

Letter to Prospective E-Usage Project Participants
    Rush Miller and Sherrie Schmidt

ARL E-Metrics Project: Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources for ARL Libraries. Phase One Report
    Wonsik "Jeff" Shim, Charles R. McClure, and John Carlo Bertot

Part 2: Phase Two Report

Measures and Statistics for Research Library Networked Services: Procedures and Issues. ARL E-Metrics Phase II Report
    Wonsik "Jeff" Shim, et.al.

- Executive Summary
- Project Overview
    1. Context and Issues
    2. Field-testing Methodology and Summary of Findings
    3. Vendor Statistics Status Report
    4. Data Collection Manual for the Recommended Network Statistics and Performance Measures
    - References
    - Appendices

Compilation of results from the E-Metrics vendor statistics field test
    Wonsik "Jeff" Shim

Part 3: E-Metrics Instructional Module

The ARL E-Metrics Instructional Module
    Amos Lakos, et. al.

    Introduction
    Part 1: The Importance of Network Measures and Statistics
    Part 2: Preparing YOUR Library to Collect, Report, Analyze, and Use the Statistics and Measures
    Part 3: Recommended Statistics and Measures for Library Networked Services

Part 4: Data Collection Manual

Data Collection Manual for Academic and Research Library Network Statistics and Performance Measures
    Wonsik "Jeff" Shim, et. al.

Part 5: Library and Institutional Outcomes

Toward a Framework of Library and Institutional Outcomes
    Bruce T. Fraser and Charles R. McClure

Analysis of the Accreditation Standards of the Six Regional Higher Education Commissions for Senior Colleges and Universities
    Bonnie Gratch-Lindauer

Measures for Electronic Resources (E-Metrics)
Complete Set

Preface

In January 1999, members of the Association of Research Libraries Statistics and Measurement Committee, the Leadership and Management Committee, and other interested member leaders, gathered in a retreat setting to discuss what ARL could do to assist members in developing new measures that better describe research libraries and their services. Those attending the retreat addressed a set of questions regarding the data needed to describe research libraries in today's environment, the need for new measures, and the means by which useful data and measurement tools could be developed. The result of this meeting was the establishment of ARL's New Measures Initiative.

One of the high priority needs expressed at the retreat was for measures in the area of electronic resources. Many libraries were expending an increasing proportion of their materials budgets for electronic information and were looking for consistent and reliable tools by which they might measure their investment in those resources and for methodologies that could help determine what difference those investments made to their user community. A planning session was held in February 2000 to determine how to structure a project that would address ARL member interests surrounding usage measures for electronic information resources. A number of members agreed to self-fund a project and Sherrie Schmidt, Dean of University Libraries, Arizona State University, and Rush Miller, University Librarian and Director, University of Pittsburgh Libraries, served as the project's co-chairs. In response to a study proposal by Charles R. McClure, ARL subsequently contracted with Florida State University's Information Use Management and Policy Institute to conduct the project.

The E-Metrics study was designed as an 18-month project in three phases: an inventory of what libraries were already doing about data collection for electronic resources and an identification of any libraries that could provide best practice; identifying and testing data elements that could be collected and used as measures for electronic resources for both trends and benchmarking; and linking the use of electronic resources to institutional outcomes. The scope of the E-Metrics project significantly expanded from the original prospectus with the (1) amount of work and the complications that developed as a result of scheduling meetings and data collection activities with vendors, (2) coordinating statistics development with other organizations (ICOLC, NISO, PALS, NCLIS, etc.), and (3) the level of effort required by everyone involved with the project to complete the field testing. At the conclusion of the field testing, the investigators provided a set of recommendations to ARL regarding the collection of data for electronic resources.

The formal, funded E-Metrics project has been completed. The Phase I report on the identification of current activities being undertaken in ARL libraries to support data collection for electronic resources was issued in November 2000. Phase II identified a set of statistics and measures that can be used to describe electronic resources in ARL libraries and was issued in October 2001. Phase III provided a document describing a project to link electronic measures to institutional goals and objectives and was finalized at the end of 2001. Project documents can be found at the project's Web site <http://www.arl.org/stats/newmeas/emetrics/index.html> and are included in this printed publication.

Part 1 of this publication contains background of the project and the report from Phase I, which documents an analysis of current practice among ARL member libraries regarding the collection of information on electronic resources. Part 2 contains the report from Phase II, which documents the process by which a set of measures was field-tested by project participants, the project investigators' and participants' work with vendor statistics, and the resulting recommendations from the project investigators about which statistics and measures should be collected. In the report the investigators provide a data collection manual that includes specific definitions on the statistics and guidance on how to structure some internal operations in order to collect the recommended statistics. Part 2 also includes a compilation of the results from the E-Metrics vendor statistics field test. Part 3 provides an instructional module for institutions to use to train their staff to collect the statistics and measures recommended by the investigators and Part 4 is the data collection manual for the recommended statistics and measures. Part 5 includes two papers regarding the linkage of measures to institutional outcomes, one by the project investigators and another a commissioned paper on the analysis of accreditation standards of higher education commissions.

The complete set of documents represents the investigators' final reports to the Association of Research Libraries and were accepted as completion of the contract. The project participants reviewed the reports from the investigators in October 2001 and have recommended to the ARL Statistics and Measurement Committee that further work in testing the suggested measures be conducted. ARL is continuing to review the other recommendations in the reports. Activities being undertaken to continue the work of the project include:

- Continued testing of the proposed measures by project participants and other interested ARL members to determine the level of effort needed to collect the data and to determine if there is enough consistency of results to be able to extend the collection effort to the whole ARL community.

- Continued work with the project's Task Force on Statistics from Vendor-Based Database Products to identify a small core set of data that vendors can provide to libraries with consistency.

- Collaboration when possible with other national and international efforts in the area of electronic resources and vendor/publisher statistics, including the option of supporting a multi-agency organization tasked to develop an achievable and widely supported common code of practice for vendor-based online usage statistics.

- Publicizing the work of the project within the ARL and academic library community.

Julia Blixrud
June 2002

Association of Research Libraries
Washington, D.C.
2002

Measures for Electronic Resources (E-Metrics)

Part 1

E-Metrics: Measures for Electronic Resources

by

Rush Miller
University Librarian and Director
University of Pittsburgh

and

Sherrie Schmidt
Dean of University Libraries
Arizona State University

Keynote delivered at the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Centers

Abstract: A major problem facing research libraries today is the lack of data about electronic resources and services. Problems and challenges in collecting and analyzing such data are many and obvious, including: there is a lack of clear and consistent definition of data elements; vendors do not "count" things in the same manner as one another; membership in a consortium can skew the statistics of the individual libraries in that consortium; libraries structure themselves differently in regard to electronic resources, making data gathering difficult; libraries do not control access to and use of important data about vendor-supplied resources; and the nature of electronic resources is changing rapidly and, therefore, data elements are shifting. The E-Metrics project, one of the ARL New Measures Initiatives, is an effort to explore the feasibility of defining and collecting data on the use and value of electronic resources. ARL has experience in tracking expenditures on electronic resources through the ARL Supplementary Statistics, but there is a widely held recognition that more work needs to be done in this area. A group of 24 ARL libraries funded and are participating in the ARL E-Metrics Project from May 2000 to December 2001. The project is under contract with Florida State University's Information Use Management and Policy Institute and is directed by Wonsik "Jeff" Shim, Charles R. McClure, and John Carlo Bertot under the leadership of project co-chairs Sherrie Schmidt (Dean of University Libraries, Arizona State University Library) and Rush Miller (University Librarian and Director, University of Pittsburgh). This paper details the rationale and context for this project; it describes the issues identified, the lessons learned, and the possibilities and challenges that this set of issues brings to the research library community.

The research library today can be described as a "hybrid" library: a library in transition from a focus on print-based collections and services to an emphasis on electronic, or digital, information resources and services. The quickening pace of change in this field is evident in the supplemental statistics data gathered by the Association of Research Libraries (ARL, 2001).[1] The percentage of acquisitions dollars that ARL member libraries devote to electronic resources has risen from 3.6% in 1992–93 to 12.9% in 1999–2000. Nine libraries spent more than 20% of their materials budget on electronic or digital materials and five libraries spent more than $2 million on such resources in 1999–2000, with University of Pittsburgh being at the top of the list spending $2,163,220.[2] One hundred and five ARL libraries reported spending a total of almost $100 million on electronic resources out of their materials expenditures budget. The cost of mounting digital information resources is far higher when infrastructure and personnel costs are factored into the picture. Clearly, the total expenditures related to electronic resources and services within ARL libraries would be measured in the hundreds of millions of dollars if it could be counted accurately and consistently.

That, of course, is the problem. While libraries, particularly ARL libraries, have 60 years of consistently defined and collected statistics related to budgets, collections, services, and personnel,[3] no such data is available for the electronic resources that are becoming ever more important. Problems and challenges in collecting and analyzing such data are many and obvious, including: there is a lack of clear and consistent definition of data elements; vendors do not "count" things in the same manner as one another; membership in a consortium can skew the statistics of the individual libraries in that consortium; libraries structure themselves differently in regard to electronic resources, making data gathering difficult; libraries do not control access to and use of important data about vendor-supplied resources; and the nature of electronic resources is changing rapidly and, therefore, data elements are shifting. Even as libraries are increasing their investment in electronic resources and the opportunities for information management are growing dramatically with the advent of the World Wide Web as a delivery vehicle, we know much less about this aspect of our collections and services than the traditional ones.

Questions related to the measurement of digital resources and services must be answered if libraries are to be accountable to their constituents and funders alike. Questions such as, "Who uses these resources?" or "Are these huge outlays of funds justified in terms of use, or value derived from use?" or "What difference do all of these resources make to students and faculty in universities?" must be answered if university administrators, trustees, students, and faculty are expected to support ever-increasing levels of funding for the acquisition and development of these resources and services. Just as important is the need for reliable measures in order to make sound decisions about the acquisition or de-acquisition of electronic resources, selection of what to digitize, and development of criteria and benchmarks that can be communicated to stakeholders.

ARL has been concerned with performance measurement issues since the 1990s.[4] The ARL Statistics and Measurement Committee and the ARL Leadership and Management Committee launched the New Measures

---

[1] Association of Research Libraries, *ARL Supplementary Statistics 1999–2000* (Washington, DC: Association of Research Libraries, 2001) Also available at: <http://www.arl.org/stats/arlstat/#sup>

[2] Ibid., 24.

[3] Martha Kyrillidou, "Research Library Trends: ARL Statistics" in *Journal of Academic Librarianship* (November 2000): 427+
________________, "To Describe and Measure the Performance of North American Research Libraries" *IFLA Journal* 27 (4) (2001): 257–263; and Association of Research Libraries, *ARL Statistics* (annual).

[4] Martha Kyrillidou and Julia C. Blixrud, "Measuring the Changing Library Environment" *Developing Indicators for Academic Library Performance: Ratios from the ARL Statistics 1996–97 and 1997–98.* (Washington, DC: Association of Research Libraries, 2001): 1–13.

Initiative in January 1999, following a retreat held in Tucson. The New Measures Initiative arises from two challenges facing research libraries: first, the need to demonstrate the impact research libraries have on areas of interest to their host institutions; and second, the need to respond to pressure to maximize resources through cost containment and reallocation, which in turn requires the identification of "best practices".[5] Coming out of the Tucson retreat, several representatives wrote white papers in areas of acknowledged interest.[6] Those attending the retreat addressed a set of questions regarding the data needed to describe research libraries in today's environment, the need for new measures, and the means by which useful data and measurement tools could be developed. The retreat participants recognized that "any new measures must (a) be consistent with organizational missions, goals, and objective; (b) be integrated with an institution's program review; (c) balance customer, stakeholder, and employee interests and needs; (d) establish accountability; and (e) include the collection and use of reliable and valid data." [7]

During 1999, the library leaders engaged in this set of activities decided that it was not enough to simply frame the issues—research libraries needed to move into testing new methods and experimenting with specific projects. With limited resources and many ideas to test and implement, a variety of projects have emerged as outlined in the annual *ARL Activities Report*.[8] There are five major projects that are being pursued within the Association under the aegis of New Measures. These are: [1] an investigation into higher education outcomes assessment, with an examination of both learning outcomes [9] and research outcomes; [2] measurement of library service quality;[10] [3] cost studies; [4] interlibrary loan and document delivery investigation; and [5] an examination of measures for networked statistics and electronic resources.[11]

The examination of measures for networked statistics and electronic resources has evolved into the ARL E-Metrics Project. The E-Metrics Project began in February 2000 at a retreat in Scottsdale, Arizona, attended by representatives from 36 ARL libraries. This retreat focused on the challenges involved in measuring the commitment to and impact of electronic resources and services in ARL libraries. Due to his extensive funded research in this area,[12] ARL employed a consultant for the meeting—Dr. Charles McClure, Francis Eppes Professor and Director of the Information Management Use and Policy Institute at the School of Information Studies at Florida State University. Rush Miller, Hillman University Librarian at the University of Pittsburgh, and Sherrie Schmidt, Dean of Libraries at Arizona State University, agreed to serve as project co-chairs. Martha Kyrillidou, Senior Program Officer for Statistics and Measurement, staffs the project for ARL. Susan Jurrow served as facilitator for the retreat.

---

[5] See: <http://www.arl.org/stats/newmeas/newmeas.html>

[6] Shirley Baker, "Ease and Breadth of Access." Available at: <http://www.arl.org/stats/program/Access.pdf>, Brinley Franklin and Danuta Nitecki, "User Satisfaction White Paper." Available at: <http://www.arl.org/libqual/ geninfo/usersatisfaction.pdf>; Carolynne Presser, "Library Impact on Research: A Preliminary Sketch." Available at: <http://www.arl.org/stats/ program/presser.pdf>; Cliff Haka, Joan Giesecke, and Jennifer Gargill, "The Measurement of Facilities Utilization in ARL Libraries." Available at: <http://www.arl.org/stats/program/Facilities.pdf>, Paul Kobulnicky and Carla Stoffle, "Market Penetration in Research Libraries." Available at: <http://www.arl.org/ stats/program/Market.pdf>, Kathryn J.Deiss, "Organizational Capacity White Paper." Available at: <http://www.arl.org/stats/program/ capacity.pdf>.

[7] Julia Blixrud, "The Association of Research Libraries Statistics and Measurement Program: From Descriptive Data to Performance Measures," 67th IFLA Council and General Conference, August 16–25, 2001. Available at: <http://www.ifla.org/IV/ifla67/papers/034-135e.pdf>.

[8] Association of Research Libraries, *ARL Activities Report 2001* (Washington, DC: Association of Research Libraries, 2001): also see *ARL Activities Report 1999* and *ARL Activities Report 2000*.

[9] Ken Smith, *New Roles and Responsibilities for the University Library: Advancing Student Learning through Outcomes Assessment.* (Washington, DC: Association of Research Libraries, 2000).

[10] Fred Heath, Colleen Cook, Martha Kyrillidou, and Duane Webster, "The Forging of Consensus: A Methodological Approach to Service Quality Assessment in Research Libraries—The LibQUAL+™ Experience" and Colleen Cook and Bruce Thompson, "Scaling for the LibQUAL+ Instrument: A Comparison of Desired, Perceived, and Minimum Expectations Responses vs. Perceived Only," forthcoming in the 4th Northumbria Proceedings. For more information and an extensive bibliography on LibQUAL+, see <http://www.libqual.org/>.

[11] ARL E-Metrics Project homepage: < http://www.arl.org/stats/newmeas/emetrics/index.html>

[12] Charles R. McClure, *Economic Benefits and Impact from Public Libraries in the State of Florida.* (Tallahassee, FL: Information Use Management and Policy Institute, 2000). Available at: <http://dlis.dos.state.fl.us/bld/finalreport/>; John Carlo Bertot, Charles R. McClure, and Joe Ryan, *Statistics and Performance Measures for Public Library Networked Services* (Chicago: ALA, 2000); John Carlo Bertot and Charles R. McClure, *Public Libraries and the Internet 2000.* (Washington, DC: NCLIS, September 2000). Available at: <http://www.nclis.gov/statsurv/2000plo.pdf>; John Carlo Bertot and Charles R. McClure, *Developing National Data Collection Models for*

The Scottsdale retreat was essential for defining the scope of a project to be undertaken, since the project was to be self-funded as well as self-managed by libraries willing to put forth a significant commitment of money and staff time. Prior to the meeting, attendees were asked to submit answers to questions about their efforts to measure the impact of electronic services and resources and their decision-making process related to these materials. Also, some attendees provided examples of the statistics they were collecting; these examples reflected the lack of consistency in current practices, as well as the lack of adequate data provided by vendors. After a full day of intensive discussions, a project began to take shape. The group identified four major areas that should be explored in the project:

1. Study of users and uses.
2. Cost and benefit analysis.
3. Study of staff impact and needs.
4. Engagement with information providers and their usage data services.

The project co-chairs worked with McClure and his staff to develop a project prospectus.[13] In the meantime, the level of commitment in terms of the number of ARL libraries electing to participate in this project doubled initial expectations, for a total of 24 libraries agreeing to support and participate in the project:

- University of Alberta
- Arizona State University
- Auburn University
- University of Chicago
- University of Connecticut
- Cornell University
- University of Illinois-Chicago
- University of Manitoba
- University of Maryland-College Park
- University of Massachusetts
- University of Nebraska-Lincoln
- University of Notre Dame
- University of Pennsylvania
- Pennsylvania State University
- University of Pittsburgh
- Purdue University
- University of Southern California
- Texas A&M University
- Virginia Polytechnic Institute & State University (Virginia Tech)
- University of Western Ontario
- University of Wisconsin-Madison
- Yale University
- Library of Congress
- The New York Public Library, the Research Libraries

The project was formalized as the E-Metrics Project and a formal contract was negotiated with the Information Use Management and Policy Institute at Florida State University to accomplish the three phases of deliverables outlined below:

Public Library Network Statistics and Performance Measures (funded by the Institute of Museum and Library Services, August 20, 2000). Available at: < http://slis-two.lis.fsu.edu/~cmcclure/IMLS.html>

[13] Charles R. McClure, "Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources in ARL Libraries." Available at: < http://www.arl.org/stats/newmeas/emetrics/phasetwoappendix.pdf>.

Phase One: A knowledge inventory of ARL libraries and the organization of a Working Group on Database Vendor Statistics.

Phase Two: Statistics and performance measures to collect and analyze data collected within libraries or provided by vendors.

Phase Three: An outline of a proposal for measuring outcomes of electronic resources, to be funded separately.

The Phase One Report[14] was submitted to ARL on 7 November 2000. In this report, McClure and the Institute staff report their findings from their collection of data related to the current state-of-the-art within ARL libraries in measuring electronic information resources and services. Their data was gathered using survey questionnaires as well as site visits to several libraries that were considered advanced in this area after an analysis of the surveys.

The survey responses revealed a wide range of data collection and use activities among the 24 project participants. The most consistently collected and used data related to patron-accessible resources and costs. Data related to use and users was collected less often since vendors provide much of the data collected and it is not kept in-house. Collected data was used primarily when making acquisitions decisions. Not surprisingly, the largest impediment to survey respondents lay in the lack of consistent and comparable statistics from database vendors.

Site visits were conducted at Virginia Tech, the University of Pennsylvania, Yale University, and the New York Public Library. These visits documented current practices and clarified survey responses. Again it was clear that a lack of standardized reporting practices makes it difficult to collect and analyze data.

Another aspect of Phase One was the organization of a working group to deal with vendor-supplied statistics. This working group met with 12 major vendors for ARL libraries in order to explore issues related to the perceived lack of consistency in vendor statistics and to solicit vendors' assistance in developing and field-testing standard data elements. The vendors who accepted the invitation to participate in the meeting include:

Academic Press/IDEAL	Bell & Howell	EBSCO
Elsevier/ScienceDirect	Gale Group	JSTOR
Lexis-Nexis	netLibrary	OCLC/FirstSearch
Ovid	SilverPlatter	

As the project entered Phase Two, the focus shifted to the definition and testing of data elements. Without solid and comparable data, measurement would be less helpful and meaningful in the long run. It was becoming clear that the project framers had underestimated the complexity of the issues and challenges. It also became clear that this project was one of many being undertaken in the United States and in other countries to accomplish similar if not the same goals.

A number of projects designed to improve the availability of consistent and comparable statistical data about electronic resources and services have been undertaken over the past several years. All of these projects are related, in one way or another, to the E-Metrics Project. However, none of them duplicated the ARL effort in terms of goals and timeframes. The project co-chairs undertook close communication links and collaboration with these projects. These projects are:

---

[14] Wonsik "Jeff" Shim, Charles R. McClure, and John Carlo Bertot, *ARL E-Metrics Project: Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources in ARL Libraries: Phase One Report*. (Tallahassee, FL: Information Use Management and Policy Institute, 2000). Available at: < http://www.arl.org/stats/newmeas/emetrics/phaseone.pdf>

- European Commission EQUINOX Project[15]
- Publishing and Library Solutions Committee (PALS) Working Group on Online Vendor Usage Statistics (UK)
- International Coalition of Library Consortia (ICOLC) review of ICOLC *Guidelines for Statistical Measures of Usage of Web-based Indexed, Abstracted, and Full-Text Resources*
- National Commission on Libraries and Information Science (NCLIS) project to standardize online database usage statistics and reporting mechanisms (public libraries)
- Institute of Museum and Library Services (IMLS) project to develop national network online statistics and performance measures for public libraries
- Council on Library and Information Resources (CLIR) report by consultant Judy Luther related to network statistics[16]
- NISO Forum on Performance Measures and Statistics[17]

During Phase Two of the project, statistical data elements were discussed within the Vendor Statistics Working Group and with participants at various meetings held at CNI, ALA, and other meeting opportunities. The consultants worked with participants to develop a set of measures to be tested in the field. These included statistical elements from vendors—worked out as a separate trial with 12 vendors—and internal library statistics to be collected by library staff.

A total of 18 measures were agreed upon for adoption as a field test. These elements were grouped into categories and included:

1. **Information Content.** This category includes elements such as the number of electronic full-text journals or reference sources to which a library subscribes. It also includes virtual "visits" to the library's electronic resources and the percentage of all monographs represented by electronic books, among other elements.
2. **Information Services.** These elements measure usage of library digital collections as well as the percentage of reference and other transactions that are digitally based.
3. **Technical Infrastructure.** Technical infrastructure is measured in terms of the cost of digital collections along with support costs and management information, such as the expenditures for electronic journals and books and other components.

An effort to field-test vendor statistics in selected libraries was also underway. This effort was designed not only to collect and analyze data elements that are agreed upon and consistent with the ICOLC Guidelines,[18] but to gather information related to the vendor's definition and compilation of these data. Judging from the work so far, vendors have varying methodologies and internal processes, which affect the consistency and standardization of data provided. Each vendor defines a search and retrieval set differently, which dramatically affects the statistics provided. It is safe to say that, until now, comparing the data from one vendor with that of a second vendor was unreliable and misleading. One benefit of this project will be to assist vendors and libraries alike in standardizing data element definitions to gain more consistency across the data.

---

[15] EQUINOX homepage: <http://equinox.dcu.ie/index.html>

[16] Judy Luther, *White Paper on Electronic Journal Usage Statistics.* (Washington, DC: Council on Library and Information Resources, 2000).

[17] National Information Standards Organization homepage: <http://www.niso.org/stats-rpt.html>

[18] "Guidelines for Statistical Measures of Usage of Web-based Information Resources," (International Coalition of Library Consortia, 2001). Available at: < http://www.library.yale.edu/consortia/2001webstats.htm>.

Internal data elements were field-tested in 13 libraries (including the University of Texas, which is not a participant in the project, but agreed to assist with the field testing, as Sue Phillips was serving in a liaison role between the ARL project and the ICOLC revision of the related guideline). Along with the data itself, these libraries were asked to track the amount of effort expended in providing the data. There was little consistency in the number of staff hours reported—it ranged from 3 to 167 hours. Much of the variance can be explained by the variability of infrastructure and experience within ARL libraries in maintaining data such as these. Libraries that are already engaged in collecting and analyzing usage and management data related to electronic resources found it easier to adapt to this field-test; those with little history or experience found it much more difficult to comply.

Libraries in the field test were also asked to analyze how useful they felt the collected data would be to them. Overall, libraries clearly saw these measures as good things to have in the absence of more detailed data.

The field-testing of these data elements was critical to a better understanding of the challenges and issues facing research libraries in systematizing e-metrics. This kind of data collection does not derive from traditional library structures, such as acquisitions, accounting, and cataloging, or from other information systems in place in libraries. Few ARL libraries have a system in place for managing electronic resources, although the number is growing. Additionally, many of the definitions and procedures for collecting this data during the field test varied from current practices within the participating libraries, although one major outcome of the project will be to develop a more standardized mechanism for gathering data. Defining changing concepts such as electronic books or full-text retrievals is painfully difficult and the distinctions among various resource types can often be arbitrary and fluid. And, of course, in ARL libraries, electronic resources are often dispersed throughout a large institution and are not centrally managed, making data difficult to collect centrally.

The field test allowed the project managers and consultants to refine the data elements further. The Phase Two report proposes a refined set of measures for implementation on an ongoing basis.[19] These elements include measures of the nature and size of the digital resources available within an institution, the cost of providing these resources by category, and the amount of activity documenting the use of these resources. The report from Phase Two is available on the Web and has been distributed to all ARL member libraries. It includes a procedures manual that provides ARL libraries with definitions and techniques for collecting standardized data related to electronic resources; these definitions and techniques will guide ARL libraries in the implementation of ongoing data collection relating to electronic resources measures. It is anticipated that these data elements will not be static—as the traditional ones have tended to be—but subject to continuous change. This is, after all, the nature of the networked environment.

From the outset of the E-Metrics Project, libraries looked beyond the development of metrics to the development of outcomes measures. Simple data is not sufficient to answer the question, "What difference does this tremendous outlay of resources make to the users of libraries?" Phase Three of the project is envisioned to study and recommend strategies and a framework for measuring outcomes, i.e., assessing the impact and value of electronic resources on user behavior and effectiveness. We all want to know what difference electronic resources make, not in terms of inputs, but in terms of outputs. Some people are asking, "Are we determined to get it right this time in terms of measuring important things rather than just convenient things?" The answer is probably that we always wanted to get it right and we always did what we thought was the right thing; yet, what is right may differ from context to context. There is often a scientific positivism associated with statistics and measures that can sometimes blind us to the emerging context and uniqueness of specific environments. Vice versa, one could argue that too much emphasis on the uniqueness of a local context fosters an isolationist attitude that may not be appropriate for a highly interconnected information environment with global dimensions that are changing, shifting, and affecting all libraries in similar ways.

---

[19] Wonsik "Jeff" Shim, Charles R. McClure, Bruce T. Fraser, John Carlo Bertot, Arif Dagli, and Emily H Leahy, *Measures and Statistics for Research Library Networked Services: Procedures and Issues: ARL E-Metrics Phase II Report.* (Washington, DC: Association of Research Libraries, 2001). Available at: <http://www.arl.org/stats/newmeas/emetrics/phasetwopreface.pdf>

The consultants working on this project have presented the results of Phase Two with some analysis of the strategy ARL might follow to achieve this higher level of institutional outcomes investigation. However, outcomes assessment is viewed as being a separate project, for which additional funding and time will be required.

CONCLUSION

The ARL E-Metrics Project is a key development in the ongoing effort to quantify and better understand the impact of emerging information technologies on library collections and services. It has provided the Association with a new measurement model—to which individual libraries have committed significant resources and effort beyond the Association structure and budget—to further develop and test in Phase Three of the project.

It is difficult to overstate the hurdles encountered in carrying out what appeared at the outset to be a rather simple idea—collecting statistics on the effort ARL libraries are making to mount electronic resources and services. The problems of definition, reliability, and consistency of data provided by the vendor community alone are daunting. But they are matched equally by librarians' lack of agreement on what is important to collect, how to collect it, and how to use what is collected. Most libraries lack experience with the collection and analysis of data related to their investment in electronic resources. This is a new, emerging, and changing field and these issues are very complex and difficult to get a handle on.

However, in less than the two years to which participants committed their funds and support, the project is producing a viable and implementable program of data collection related to electronic networked resources in ARL libraries. This accomplishment is to the credit of the directors and staff of these 24 libraries; it is also largely due to the expertise and hard work of the director and staff of the Information Use Management and Policy Institute at Florida State University.

In developing e-metrics, libraries are only part of a larger networked community concerned with similar issues. Some libraries are concerned with the competition presented by Internet search engines, gateways, and portals. Some libraries feel the need to demonstrate large numbers of Web hits and other e-metrics to justify their investment in electronic resources. Yet, no matter how large an electronic library is, it is doubtful that it will ever receive more Web hits than popular search engines, gateways, and portals such as Yahoo and Google. Libraries, though, have much more valuable resources to offer than do any Internet search engine—it is our challenge to try to measure these contributions.

Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources for ARL Libraries:

Study Proposal

Charles R. McClure <cmcclure@lis.fsu.edu>, Francis Eppes Professor, and
Director, Information Use Management and Policy Institute
School of Information Studies
Florida State University
April 28, 2000

The Need for Action

The rapid changes—and advances—in delivering information services and resources electronically pose critically important challenges to the Association of Research Libraries (ARL). These new techniques in the delivery of electronic and networked information have left many ARL libraries with inadequate data to make a range of decisions to provide cost-effective and high quality electronic services to their users. Basic questions such as the following have yet to be adequately answered:

- What methods can be developed to determine who are the users, what are the uses of electronic information services and resources delivered by ARL libraries, and what is the frequency of that use?

- How can ARL libraries obtain timely, reliable, comparable, and useful data from database vendors that describe uses and users of the databases? And, how can ARL libraries affect the process that determines the types of data they received from the database vendors?

- To what extent can electronic information services and resources be linked to a range of library and higher education outcomes?

As demonstrated at the ARL Scottsdale meeting on New Measures in February 2000, a number of ARL libraries are working on these and related questions. The methods being developed, however, to answer these and related questions are not coordinated and are unlikely to be generalizable across the spectrum of ARL libraries.

The study prospectus described here provides a three-phased approach to answer these and other questions regarding statistics and performance measures in the delivery of electronic services and resources. Upon the successful completion of the study ARL libraries will have:

- A report that summarizes the current "state of the art" of best practices in ARL libraries for collecting and reporting statistics and performance measures related to electronic resources and services. This report will include *practical* suggestions and techniques that will be of use to ARL libraries for describing electronic services and resource use and users.

- A set of statistics and performance measures that describe electronic information use, users, costs, and staffing. These statistics and measures can assist ARL administrators make better decisions regarding deployment, use, and purchase of electronic services.

- A short, concise manual that describes possible procedures for how to collect, analyze, and report data to produce such statistics and performance measures. The manual will stress practical and usable techniques that can be used in ARL libraries as well as identify key issues to consider when using such statistics.

- A one-day workshop for interested ARL staff offered by members of the study team that will introduce the manual, describe how best to use it, and discuss issues that should be considered in the use of the manual.

- A process to collaborate with database vendors to develop, refine, and create statistics and performance measures needed to describe database use, users, and costs. The objective of this process is to ensure that database vendors understand the need and importance of ARL libraries obtaining reliable and comparable use and user data describing database use and users.

- Models that link and describe relationships and possible impacts between electronic services and resources and higher education outcomes. These models will attempt to show where and how electronic services and resources contribute to accomplishing selected higher education outcomes.

These products will be a first set of tools, processes, and techniques that will assist ARL libraries (1) better meet the needs of their users, and (2) make better decisions regarding the purchase, use, and deployment of electronic services and resources.

Leveraging Existing Knowledge

There is a limited number of writings and still less research available regarding the development of statistics and performance measures for the academic networked environment. This prospectus does not provide an overview of these writings – many of which are listed on a bibliography on the New Measures Web page at <http://www.arl.org/stats/newmeas/e-usage.html>. Generally, the literature identifies a range of issues and problems regarding the development of such statistics. The literature does not, however, adequately represent the practical knowledge and current practice in this area—which was identified at the February 28–29, 2000, ARL conference in Scottsdale.

There is expertise outside the published literature that can be leveraged by this project. The author has been working to develop networked statistics and performance measures for public libraries under a project funded by the Institute for Museum and Library Services (IMLS) <http://www.albany.edu/~imlsstat/>. Currently, a number of statistics and measures are being field tested—some of which would have clear applicability to academic libraries. Further, the project has established important contacts and meetings with a number of database vendors to discuss the range and types of data that they might provide to state and public libraries.

In addition, the author is working with the National Commission on Libraries and Information Science (NCLIS) on the project, *Testing National Public Library Electronic Use and Network Performance Measures* <http://www.nclis.gov/libraries/lsp/statist.html>. Building on the IMLS study, additional work is envisioned to meet and collaborate with database vendors to determine the types of data that can be reasonably obtained for libraries. Academic libraries' direct and formal involvement to participate in and extend these efforts to address academic library database statistical needs and issues could build on existing work and demonstrate the interest and concern of the ARL community.

BACKGROUND

This study prospectus has been under development since fall 1999 when the author discussed the possibility of such a study with ARL staff and members of the New Measures Initiative <http://www.arl.org/stats/newmeas/newmeas.html>. Given an initial level of interest with leaders in the New Measures Initiative and ARL staff, a preliminary project prospectus was presented for discussion at a meeting held in conjunction with the December 1999 Coalition for Networked Information (CNI) meeting in Phoenix.

Based on discussions and interest from the meeting at CNI, McClure re-drafted the prospectus and it was distributed to a number of ARL members and posted at the ARL Web site. Leaders of the New Measures Initiative with ARL staff organized a meeting on February 28–29, 2000, to discuss the appropriateness of working in the area of developing statistics and performance measures for networked information services and resources. Seventy participants discussed aspects of the project at the meeting and provided guidance and suggestions for a study. This Study Prospectus is based on the discussions and outcomes from that meeting.

A CHANGING CONTEXT

Clearly, the context for delivery of library services and resources is changing to an electronic environment. While there has been considerable discussion about the need and importance of developing statistics and performance measures to describe networked and electronic services and resources, a unified research strategy is needed to move forward on this topic.

The Key Term

The working definition of *network-based information services* is: Those electronic information resources and/or services that users access onsite in the library, from their office, dorm, or home, or from regional/statewide networks. Examples of electronic networked resources include: local, regional, or statewide library hosted or authored Web sites or library-licensed databases (e.g., Infotrac, SearchBank, EbscoHost). Especially important are statistics that describe the use of unique and oftentimes interactive remote scientific and technical databases.

Examples of electronic networked services include: provision of access to networked services such as email, listservs, online reference/assistance, and training in the use of these resources and services. In addition, libraries increasingly provide interactive services such as requesting services via online forms (interlibrary loans, etc.). It is likely that the term "networked information resources and services" will continue to evolve as the network evolves and as the study progresses.

Growth in Electronic Services and Resources

The move to a networked environment has significantly increased the range of services and resources that the library provides its users. The library has become a 24 hour a day access point to information services where users obtain services and resources on *their* terms and when *they* want such services—oftentimes *not* coming to the library physically nor interacting directly with library staff. The costs to provide these networked services and resources, however, can be significant. Librarians' inability to develop reliable and accurate methods to describe these services and costs injures their ability to make good resource allocation decisions, meet user needs, and develop strategic plans for the development and operation of electronic services and resources.

On an experiential basis, most ARL librarians will describe the use of their networked information services with terms such as "exponential growth" or "we can't keep up with demand." At the same time, a number of ARL libraries have also seen stagnant or declining statistics of traditional indicators of library service such as turnstile counts, in-house reference transactions, circulation, etc. While there is a need to develop new statistics such as "virtual visits," "full-text downloads," "electronic reference transactions as a percentage of all transactions," etc., there is little agreement on how to compute such statistics and measures.

Example Possible Statistics

The work done by the author and others in the IMLS project, individual ARL libraries, as well as work under way with the NCLIS study suggest that a number of statistics describing networked and electronic services and resources may be developed in the following areas:

- Count of electronic reference transactions.
- Virtual visits (sessions) to the library's Web site.
- Counts of high-use and low-use Web pages.
- Count of sessions on specific databases.
- IP addresses for sessions on specific databases.
- Time per session on specific databases.
- Turn-aways per time period per specific database.
- Primary use of selected electronic services and resources.
- Hours of user training on electronic services by library staff.
- Cost per session on specific databases.
- Count of full-text downloads per time period per database.

- File size of full-text downloads per time period per database.
- Count of on-site versus remote sessions per database.

These proposed statistics are illustrative only. Yet to be accomplished is agreeing on definitions and data collection methods to produce reliable and valid statistics, determining the degree to which such statistics can also be comparable across different libraries, and making linkages between such statistics and higher educational outcomes. In short, considerable work has yet to be done.

Issues and Challenges

Some of the factors militating against the development of networked statistics and performance measures include the following:

- Librarians do not control access to and use of a range of data that describe vendor-supplied information services and resources. Some vendors are unwilling or unable to provide the types of statistics and use data that librarians request. Statistics and measures for database use and services, nonetheless, are essential.

- The rapidly changing nature of the networked environment also affects the types of services and resources that can be provided by libraries. As the networked services change, new types of statistics and measures may be needed.

- The level of effort needed to collect, analyze, and report data to produce statistics and performance measures for the networked environment may be greater than that needed to produce more traditional statistics.

- Sometimes networked services costs and use may be difficult to "unbundle" if the library obtains these services through a consortium. Costs can either be hidden or be extremely difficult to allocate to individual libraries.

Librarians may be entering a period of time where statistics and measures for networked services may be useful for two to four years and then will have to be re-developed or discarded. Such an environment is quite different than the statistics-collecting environment in which academic libraries previously existed. Despite these concerns and factors, ARL libraries need to move forward and learn how best to produce and use such statistics and measures in this new environment.

Project Goals and Research Questions

One key goal of this project is to develop, test, and refine selected statistics and performance measures to describe electronic services and resources in ARL libraries. A second goal is to engage in a collaborative effort with selected database vendors to establish an ongoing means to produce selected descriptive statistics on database use, users, and services. A third goal of the project is to develop a proposal for external funding to maintain the development and refinement of networked statistics and performance measures. More specifically, the project has the following research questions:

- What existing techniques and approaches are being used by ARL libraries to produce statistics and performance measures to describe networked information services and resources? What can be learned from these techniques that could be generalized to other libraries?

- For what purposes and for what audiences are networked statistics and measures needed?

- Which types of networked services and resources should be described, how should they be defined and operationalized, and how should the data be collected to insure reliable and valid data?

- What performance or quality indicators are needed to describe the impact and success of such networked services?

- How might such statistics and measures be best reported?
- What linkages can be established between these statistics and performance measures with selected outcomes from higher education?

This list of research questions suggests a beginning perspective to direct project activities. These research questions may be revised as the project proceeds.

Project Approach and Management

This prospectus assumes that a group of interested ARL libraries will work together as a consortium in conjunction with a study team at the Information Management Use and Policy Institute at Florida State University <http://www.ii.fsu.edu> and with ARL staff. The members of this group would each agree to make a commitment of $10,000 to fund the project. The study would begin May 12, 2000 and be completed December 2001 (20 months). ARL libraries would make their contribution to ARL; the Information Management Use and Policy Institute would then enter into a contract with the Association of Research Libraries to complete the study as outlined in this prospectus.

Participants in the study may have varying levels of direct involvement in the project. Some may decide to be *active* participants in the project in which they would provide detailed descriptions of their current activities regarding the collection and use of networked statistics; participate in reviewing and commenting on project documents and reports; serving as field sites to test and refine statistics and performance measures; meet with other participants to review project activities; organize meetings and handle logistics related to those meetings; provide direct feedback and work with the study team to complete project goals; and engage in specific data collection/analysis activities related to project activities. Other study participants may decide not to participate in such activities or only in those especially appropriate to their institution.

In each participating library there would be one person who would serve as a liaison and as a single point of contact to coordinate project activities. Depending on the level of involvement by the library, this person should be prepared to contribute up to 25% of his/her time to the project with some additional assistance from others in the library from time to time.

All libraries participating in the project may appoint a representative to serve on the project's advisory committee (AC). This group will provide feedback and suggestions to the study team as needed; they will be kept informed of project activities; and they will meet from time to time (electronically and in person) to discuss project progress and issues. The advisory committee will be co-chaired by Rush Miller and Sherrie Schmidt. Miller and Schmidt will serve as the single point of contact with the study team.

Three types of staff time will be committed to this project. First, the study team at Florida State University will commit time and effort to the project as described later in this prospectus. Second, staff from participating ARL libraries will be contributing time and effort to the project as described earlier. Third, ARL staff will commit time and effort to the study by assisting in selected data collection activities, insuring effective communications with ARL libraries, providing background information and resources, and maintaining a Web site to describe and update project activities.

Project Phases and Activities

Based on discussions at the ARL New Measures invitational conference held in Scottsdale, AZ, February 28–29, 2000 the following project phases and activities have been developed. Note that two or more activities within a phase may occur simultaneously. The project activities related to developing statistics from database vendors are an ongoing process throughout the entire study. Upon project funding detailed scheduling and tasking will occur.

Phase I: Knowledge Inventory of ARL Libraries and organizing an ARL Working Group on Database Vendor Statistics (May 2000–October 2000)

The two objectives of this phase are to (1) identify and describe the current state of the art of statistics and performance measures for networked services and resources in ARL libraries, and (2) organize an ARL Working Group on Database Vendor Statistics to begin discussions with database vendors.

Activity 1 of this phase will be to conduct an inventory that will survey all ARL libraries as to their current practices, activities, statistics, performance measures, data collection and reporting processes. After the survey has been completed, the study team will conduct site visits at those libraries that appear to have the most useful information and insights into study topics. The inventory will stress data collection, statistics, and performance measures in the following areas:

- Users of networked information services and resources, e.g., who are the users of specific types of networked services and resources?
- Uses of networked information services and resources, e.g., what are the applications and uses of these services and resources by the users?
- Staffing and training, e.g., how have networked information services and resources affected the staffing and staff training in libraries?
- Networked information services, e.g., electronic reference transactions, electronic forms submission, etc.
- Cost analysis of networked information services and resources, e.g., what are the costs per transactions of particular services such as cost per full-text download?
- Vendor-based database information, e.g., what statistics are being compiled by which libraries from which vendors with what information and how are those data defined? NOTE that this area is an ongoing project effort that continues throughout all phases of the project.

Initially these topics will provide a first priority for inventorying the current knowledge of ARL libraries related to networked services and resources.

Due to a research award received by study team member Jeff Shim, Florida State University, he will be able to conduct site visits during the summer of 2000 to selected ARL libraries at no cost to the project.

Activity 2 initiates a process whereby an ARL Working Group on Database Vendor Statistics can begin discussions with selected vendors regarding a plan to identify, collect, and report various database statistics. Such statistics include, but are not limited to, uses of the databases, frequency of use, time of use, log-ins to particular titles, IP addresses of log-ins, turn-aways, etc.

Tasking for this phase includes the establishment of an ARL Working Group on Database Vendor Statistics: having the group define key issues and objectives; coordinate activities with ICOLC and other appropriate groups; propose possible guidelines and procedures for vendor-produced database statistics; begin meeting with selected database vendors; and develop a process to clarify needs and expectations by both the vendors and the ARL Working Group.

Products from Phase I: The product from Phase I will be an interim report that:

- Describes the knowledge and best practices currently in use by ARL libraries regarding statistics and performance measures for electronic information services and resources;
- Describes the range and types of data being obtained by ARL libraries from the various database vendors;
- Describes key issues that will need to be resolved in producing statistics and performance measures; and
- Presents a status report on the activities of the ARL Working Group on Database Vendor Statistics, its objectives, and its next steps in Stage II.

In addition, members of the study team will provide an Executive Briefing to project participants in conjunction with the fall 2000 ARL meeting.

Phase II: Development of statistics and performance measures (November 2000–June 2001)

The objective of this stage is to develop tools, data collection processes, statistics, and performance measures to describe services and resources in the networked environment.

Activity 1 will develop an approach to take the knowledge learned from Phase I into a research methodology to develop, define, and propose possible statistics and measures. In short, the activity will produce a detailed tasking and methodology by which statistics and performance measures can be developed, tested, and refined. This activity will also propose data collection techniques and instruments for use by participating libraries to produce statistics and measures in each of the areas identified in Phase I. The process will draw heavily upon input and advice (in an iterative fashion) from participating libraries.

Activity 2 will be the field testing of these proposed data collection techniques, statistics, and measures. The study team anticipates that four to six participating libraries will serve as field sites to test the approaches developed in Phase I. A process will be developed for each library to test some portion of the proposed statistics and report on the efficacy of the process as well as the statistics and measures themselves.

Activity 3 will be the analysis of the field test results and the writing of a short manual that describes the process for data collection, the statistics, and the performance measures. The study team will determine what appears to be working well in terms of process and what needs additional work and revision. Depending on the results from the field test, some additional work and refinement on selected statistics and measures may be needed prior to writing the data collection, statistics, and measurement manual.

Activity 4 of this phase is to develop a model that integrates the statistics and measures into (1) higher education educational outcomes, research outcomes, and service outcomes, and (2) library educational outcomes, research outcomes, and service outcomes. In fact, this phase will be under development throughout the entire phase as development of statistics and measures must occur in the broader context of their purposes and their relationship with higher education outcomes. Findings from Phase I will inform the development of such models.

Activity 5 of this Stage is to continue activities of the ARL Working Group on Database Vendor Statistics. This effort is ongoing throughout Phase II. During this phase we would expect that meetings between the ARL working group and the database vendors would be moving toward agreement on data element definitions and terms, to specific statistics and data that can be collected, and methods for reporting these data to libraries. The study team would expect to include these data collection techniques in the field test described in activity 3 above.

Products from Phase II include;

- A written methodology to develop and field test data collection techniques, statistics, and performance measures;
- A short concise written manual that describes how these statistics and measures can be produced, that will include:
    - introduction to the importance and need for statistics and performance measures that describe electronic services and resources;
    - data collection techniques and methods for each of the statistics and performance measures;
    - issues to be considered in using and interpreting these statistics and performance measures;
    - recommendations for future work in the development of new or refinement of existing statistics and performance measures; and
    - appendices of data collection instruments developed and tested during the field tests;

- A written status report on the activities and accomplishments of the ARL Working Group on Database Vendor Statistics, and issues/next steps to be addressed; and

- A one-day workshop, held in conjunction with ALA or an ARL meeting to present the manual and discuss project findings during the late spring of 2001.

Phase III: Institutionalizing Statistics and Performance Measures (July 2001–December 2001)

The objective of this phase is to develop mechanisms and processes that insure the ongoing development of networked statistics and performance measures. This objective includes building and promoting infrastructure in ARL and ARL libraries to continue the development and use of such statistics and measures.

Activity 1 of this phase is to develop a research proposal to obtain external funding to continue research and field testing related to networked information statistics and measures. The study team will work with ARL staff and the advisory committee in the development of this proposal and the identification of appropriate funding bodies that may be interested in supporting continued work in this area. Specific research questions and initiatives in this proposal will result from findings and activities in Phase II.

Activity 2 of this phase is to develop a number of training modules and training support systems (both in print and electronically) that ARL and ARL libraries can use to assist staff understand the importance of the new statistics and measures developed as part of this project, as well as help them on a very practical level collect, analyze, and report quality data. The study team anticipates developing and testing these modules but assumes that ARL members or ARL staff would be actively engaged in the instruction.

Activity 3 of this phase is to continue refining and testing the model(s) that integrate the statistics and measures into (1) higher education educational outcomes, research outcomes, and service outcomes, and (2) library educational outcomes, research outcomes, and service outcomes. The study team anticipates developing a process to validate these models and determine the potential usefulness of the model(s) to describe impacts from networked information services and resources.

Activity 4 of this phase will continue activities of the ARL Working Group on Database Vendor Statistics. This effort is ongoing throughout Phase III. During this phase we would expect that meetings between the ARL Working Group and the database vendors would have reached agreement on data element definitions and terms, on specific statistics and data that can be collected, and methods for reporting these data to libraries. The study team would expect to assist the ARL Working Group extend the number of database vendors agreeing to the guidelines that would have resulted for data collection and statistics.

Products from Phase III include:

- A proposal that can be submitted to potential fundors to continue research and development on statistics and performance measures in the networked environment and their potential impacts on a range of higher education outcomes;

- A revised and updated description of database statistics and performance measures. Based on the additional activities of the working group and discussions with database vendors we would expect to be able to build upon the database statistics developed in Phase II and expand and refine them;

- Instructional modules that can assist ARL and ARL member institutions train staff as to the importance and process for collecting and analyzing networked statistics and performance measures; and

- A final report of guidelines and issues yet to be resolved as agreed to by ARL and participating database vendors on the collection and reporting of selected statistics and data elements from these databases.

It should be recognized that some fine-tuning of these phases and activities may occur as the project proceeds. Such fine-tuning will be done with the advice of the advisory committee.

Study Team Qualifications

Charles R. McClure will serve as the Principal Investigator for the study. Detail on his background, experience, and examples of recent projects he has completed can be found at <http://slis-two.lis.fsu.edu/~cmcclure>. Information about the Information Use Management and Policy Institute for which he serves as director can be obtained at <http://www.ii.fsu.edu>. He has a proven track record of managing projects successfully and has worked with public libraries in a range of areas including financial assessment, planning and evaluation of information services, information technology management, and resource sharing. Currently, with John Carlo Bertot, he is completing a study funded by the Institute for Museum and Library Services (IMLS) that will produce national statistics and performance measures to describe public library services and resources in the networked environment <http://www.albany.edu/~imlsstat/>.

John Carlo Bertot is an Associate Professor in the School of Information Science and Policy at SUNY Albany. He has worked with and Charles R. McClure successfully on a number of library studies, including the *Public Libraries and the Internet* national surveys from 1994 through 1998, and Internet project impact studies in Pennsylvania (*Evaluation of the Online at PA Libraries Project: Public Access to the Internet through Public Libraries*) and California (*The Importance of California Public Libraries in Increasing Public Access to the Internet*). Bertot and McClure have also collaborated on a number of technology planning and evaluation projects. Additional background information on Bertot's experience and skills can be found at <http://www.albany.edu/~jcbertot/>.

Jeff Shim, Assistant Professor of Information Studies at Florida State University and a Research Associate at the Information Use Management and Policy Institute will also serve on the study team. Shim recently completed his Ph.D. from Rutgers University where his primary research centered on an analysis of ARL statistics. He teaches in a range of areas related to the management of information technology. He is especially knowledgeable about academic library statistics, statistical techniques for describing services and resources, and understands information technology-based services provision.

Additionally, we expect that a number of Ph.D. students and other graduate students from the School of Information Studies at Florida State University will be working on the project as research assistants. These additional staff will be involved on the project, oftentimes with no additional cost to the project.

Budget and Financial Arrangements

The budget for this project is $199,990 and is summarized in Figure 1. Every effort has been made to keep overall costs to a minimum and use budgeted monies as effectively as possible.

Figure 1. Budget May 2000–December 2001

Personnel*	$143,844
1. Charles R. McClure, Principal Investigator 2. Jeff Shim, Associate Director 3. John Bertot, Associate Director 4. Bruce Fraser, Project Manager 5. Research Assistants * Summer (May–August) will have greater average study team time commitment than the academic year	
Benefits on Personnel	28,446
Study Team Travel to ARL Libraries and Meetings	19,000

[16 trips @$1200 per trip]		
National Workshop [at end of Phase II]		1,250
Communications [supplies, telephone, copying, etc.]		7,250
	Total	$199,990

The primary expenses will be for study team personnel, travel expenses to conduct field tests and participate in various meetings, and various communications support. The study would be conducted as a fixed-price contract. One-fourth of the project costs will be paid upon formal agreement to conduct the study, with one-fourth of the project costs paid at the conclusion of each of the three stages.

Project Communications

The study team anticipates regular and ongoing communication with participating institutions as well as all ARL libraries via the ARL New Measures Project Initiative Web site (on the ARL or another Web site). ARL staff as well as possibly other staff from ARL participating libraries will have responsibility to mount project information, updates, project reports, issue papers, and other items on that Web site.

In addition, a discussion list related to the project will be operated and maintained by ARL for regular posting of information and for the exchange of ideas and views related to the project and the development of statistics and performance measures related to the networked environment. Regular meetings (either in conjunction with other professional meetings or electronically) will occur with the advisory committee to discuss project activities. The project Advisory Committee Chairs and project liaisons (Miller and Schmidt) will keep other committees at ARL apprised of project activities as needed.

Use of Project Information and Findings

The study team reserves the right to use data and findings from this project in other future studies and research efforts. Indeed, much of the insight and information that the study team brings to this effort is a result of years of previous research and related projects. In addition, McClure, Bertot, and Shim reserve the right to publish papers (hopefully in conjunction with project participants) and otherwise use information from this project for other educational and instructional purposes. Any papers submitted for publication would be provided to the liaison for review and comment prior to actual publication and would acknowledge the support of the project. Data and related findings from the project would be reported in aggregate form only and would not be linked to individual libraries.

Importance of the Project

To some extent, ARL libraries are under-representing and under-counting the range of services and resource provision in which they are engaged because there are no agreed upon means to count and describe service provision in the networked environment. In addition, resource allocation decisions are further complicated by a limited understanding of the use and costs of services provision in the networked environment. Given this situation, library administrators are oftentimes unable to demonstrate the importance and impact of such networked-based services. Such is true for individual libraries as well as for ARL libraries as a group.

Clearly, the problems and issues identified in this prospectus regarding counts and measures of services and resources in the networked environment will not disappear in the near future. Indeed, these issues are only likely to increase in importance as the networked environment evolves with a range of *new* services and resources. Support for this project provides ARL and a group of ARL libraries to take a leadership role in the process of developing statistics and measures for services and use in the networked environment. It provides a basis for ARL libraries to formally begin work with selected database vendors to reach agreement on possible data reporting activities. And… the project will begin to develop linkages between these statistics and performance measures and a range of higher education outcomes.

Most ARL libraries need such statistics and measures *now*. The sooner work is initiated on a project such as that outlined in this prospectus, the sooner such statistics and measures can be used to support resource allocation decisions, services provision and assessment, and strategic planning.

ASSOCIATION OF RESEARCH LIBRARIES

March 22, 2000

To: Prospective E-Usage Project Participants

From: Rush Miller, University of Pittsburgh
Sherrie Schmidt, Arizona State University Library
E-Usage Project Co-chairs

Re: ARL Project on Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources in ARL Libraries

RESPONSE REQUESTED BY APRIL 7, 2000

Thank you for participating in the February 27-29 Scottsdale E-Usage project Planning Meeting by sending your institutional representative(s). This meeting facilitated a rich exchange of information about electronic information services and served to define the parameters of an ARL project in this area.

As indicated at the meeting at Scottsdale, you are now invited to respond to a call for participation in this project. We need your response by April 7 in order to initiate project activities by May 12. A study prospectus describing the goals, methodology, and deliverables is enclosed. The prospectus was prepared by project consultant Charles R. McClure with advice and feedback from the co-chairs and ARL staff. We believe this study prospectus will provide enough information for you and your key executives to make an informed judgement about participation.

Each participating library is expected to contribute $10,000 to underwrite the operating costs of the study. In addition, participating libraries will need to contribute some staff time and other supporting resources. Actual levels of participation may vary by library depending on a number of factors.

We are looking for at least 12 and no more than 20 institutional participants. These institutions should have an active electronic information services program and some experience with statistics and performance measures for electronic resources. The participating libraries should also reflect a balanced representation of ARL member institutions in terms of type (public/private), size, and geographic location.

ARL intends to finalize the contractual arrangements with the Florida State University Information Management Use and Policy Institute by early May and initiate the project activities before the ARL Membership Meeting in May. All study findings and recommendations will be provided to the full ARL membership.

Please respond directly to Martha Kyrillidou martha@arl.org as to whether you would like to participate and why participation is important to your institution. If you would like additional information, please contact us, the project co-chairs, Sherrie Schmidt <sherrie.schmidt@asu.edu> and/or Rush Miller <rgmiller+@pitt.edu>.

21 Dupont Circle NW
Washington, DC 20036
202 296 2296 telephone
202 872 0884 fax
http://www.arl.org/

ARL E-METRICS PROJECT: DEVELOPING STATISTICS AND PERFORMANCE MEASURES TO DESCRIBE ELECTRONIC INFORMATION SERVICES AND RESOURCES FOR ARL LIBRARIES

PHASE ONE REPORT

By

Wonsik "Jeff" Shim <wshim@lis.fsu.edu>
Charles R. McClure <cmcclure@lis.fsu.edu>
John Carlo Bertot <jcbertot@lis.fsu.edu>

And

James T. Sweet
Jean-Michel Maffré de Lastens
Arif Dagli
Bruce T. Fraser

Information Use Management and Policy Institute
School of Information Studies
Florida State University
Tallahassee, Florida 32306-2100
850-645-3326

November 7, 2000

EXECUTIVE SUMMARY

This report provides a description of activities and findings from Phase I of the Association of Research Libraries (ARL) sponsored study, *ARL E-Metrics Project: Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources for ARL Libraries.* Overall, Phase I finds that a number of ARL libraries participating in the project have developed useful strategies and approaches for developing statistics and performance measures to describe use, users, and uses of electronic and networked information services and resources. Despite these strategies it appears to be too early to offer "best practices" in developing and using such statistics and performance measures. The study also identified a number of key issues that will require additional attention as the project continues into Phase II.

This study began in April 2000. The three primary goals of this project are to:

- Develop, test, and refine selected statistics and performance measures to describe electronic services and resources in ARL libraries;
- Engage in a collaborative effort with selected database vendors to establish an ongoing means to produce selected descriptive statistics on database use, users, and services; and,
- Develop a proposal for external funding to maintain the development and refinement of networked statistics and performance measures.

A group of 24 ARL libraries funded the study and are participating in it; this project is under contract with Florida State University's Information Use Management and Policy Institute and is directed by Charles R. McClure, Wonsik "Jeff" Shim, and John Carlo Bertot under the leadership of project co-chairs, Sherrie Schmidt, Dean of University Libraries, Arizona State University Library, and Rush Miller, University Librarian and Director.

Phase I was *Knowledge Inventory of ARL Libraries and Organizing an ARL Working Group on Database Vendor Statistics* (May, 2000 – October, 2000). The two objectives of this phase were to (1) identify and describe the current state of the art of statistics and performance measures for networked services and resources in ARL libraries, and (2) organize an ARL Working Group on Database Vendor Statistics to begin discussions with database vendors.

The study built upon a conference held in Scottsdale, AZ in February 2000 that was intended to organize the project. Phase I relied on the following types of data collection methods:

- Survey questionnaires;
- Site visits to selected libraries;
- Sample vendor reports supplied by members of Vendor Statistics Working Group;
- Sample library generated reports obtained from project participants; and,
- Follow-up interviews with participants as necessary.

These efforts produced a number of findings as well as identified key issues and recommendations that are detailed in this report. It is important to stress that the findings and recommendations are based on data from participating libraries and may not be generalizable to the larger group of ARL libraries.

Key findings from the study include the following:

- *Findings from the survey*: Analysis of the E-Metrics survey responses reveals a wide range of data collection and use activities among project participants. It appears that measures related to patron accessible resources and costs are collected more consistently and systematically than measures related to electronic resource use or users of those resources. Due to the often inconsistent and non-comparable nature of vendor supplied statistics, libraries seem to have considerable difficulty in tracking overall electronic database usage and use patterns.

  The collected data seem to be shared widely among library staff and with parent institutions. However, the manner in which the information is communicated and the nature of the reporting process appear to be limited. Data are most often used to make purchasing decisions for licensed vendor materials. People also indicated various uses of the data for the purpose of internal and external reporting and service assessment and evaluation.

  Regarding the most important issues related to performance measurement of networked resources and services, the majority of respondents cite the lack of consistent and comparable statistics from database vendors as the most serious problem. Relatively few respondents recognized or identified problems associated with the library's inability to process and utilize collected data.

- *Findings from vendor reports*: Analysis of usage statistics from 12 major database vendors reveal that there is a wide range of different practices and that progress should be made in several areas including standardization of core statistics, report delivery method, and assuring the provision of definitions of reported statistics. There are some signs in the way vendors report data that indicate increased cooperation between libraries and the vendors.

- *Findings from site visits* (VT, U Penn., Yale, NYPL): Libraries reside under different operating environments and have very different needs in terms of data to describe electronic services and resources. The environment differs because of the institution's involvement with the library operation, the library's top management attitude toward evaluation efforts, and the library's needs related to data.

  Libraries have a serious problem managing information describing the use of electronic resources and services. This is particularly the case with regard to licensed vendor materials primarily because descriptive data often reside under vendor control. Libraries often have to manage different interfaces to obtain different types of resources, and, accordingly, usage statistics are distributed among typically several dozen database vendors and consortia. Due to a lack of standardized reporting practices, usage reports are difficult to consolidate, or it takes an enormous amount of effort to collect such data. Non-vendor based data collection efforts to describe electronic services and resources appear to have received less attention than database efforts.

While libraries are making progress in some areas of measurement of electronic resources, libraries have yet to succeed in producing a coherent plan or strategy for using and reporting statistics and measures related to electronic information.

In addition, the study identified a number of issues that will require additional discussion and resolution:

- *Complexity of the topic*: participating libraries, vendors, the study team, and users may not understand the complexity of developing statistics and performance measures for electronic services and resources.
- *Diverse context for developing statistics and performance measures*: each of the various ARL libraries operates in a unique setting that affects the development and use of specific statistics and measures.
- *ARL library responsibilities and level of effort*: there are a range of internal factors that affect the degree to which the library can provide resources and an adequate level of effort to collect data needed for such statistics and performance measures.
- *Focus on non-vendor based data sources*: there are a number of statistics and measures that may be developed that do *not* depend on the database vendors and libraries.
- *Coordination among libraries and library organizations*: there are numerous libraries, organizations such as NISO, NCLIS, ICOLC, etc. who are interested in developing standards for electronic and networked services and resources whose efforts will need some coordination.

The report discusses these issues in greater detail and will be important areas for attention in Phase II of the study.

Although findings from Phase I of the study did not identify a set of "best practices" for developing electronic and networked statistics and performance measures, the study team can recommend a number of very specific strategies that can assist participating libraries better prepare for data collection to produce such statistics. These strategies include developing a culture of evaluation; stressing the use and development of statistics and measures in strategic planning documents; reorganizing for assessment, data collection, and reporting; and, developing a data advocate within the library. Part 4 of the report details these and other strategies.

The Phase I report concludes with a discussion of next steps to be taken in Phase II. These next steps are based on the activities and objectives as outlined in the original study proposal. Nonetheless, these steps include:

- Developing and field-testing possible statistics and performance measures to describe services and resources in the electronic environment;
- Addressing the key issues outlined above and detailed in Part 4 of the Phase I report;
- Organizing the Vendor Statistics Working Group and meeting with selected vendors to discuss statistics and measures for databases; and,
- Conducting or participating in a number of meetings during Phase II to coordinate the library community's efforts to develop such statistics and measures.

Phase II will be completed in June 2001 and will result in a short manual that proposes statistics and measures that libraries can use to describe and assess electronic services and resources.

Table of Contents

Executive Summary 2

Phase One Summary 6

PART 1: Introduction 9
  ARL E-Metrics Project Overview 9
  Related Projects and Studies 10
  Phase One Objectives and Research Questions 12

PART 2: Methodology 13
  Survey Questionnaires 13
  Site Visits 15
  Vendor Reports 16
  Limitations of the Study 17

PART 3: Summary of Findings 18
  E-Metrics Survey Findings 18
    Data Collection 18
    Data Use 23
    Issues 24
    Willingness to Participate in Benchmarking 26
    Summary of Survey Findings 26
  Comparison of Vendor Reports 28
    Overall Comparison of Vendor Reports 28
    Provision of Definitions of Measures 30
    Vendor Compliance to the ICOLC guidelines 32
    Summary of Vendor Reports Comparison 33
  Site Visit Report 34
    VT Library 34
    University of Pennsylvania Library 39
    Yale University Library 43
    The Research Libraries at New York Public Library 46
    Summary of Observations 47

PART 4: Issues, Short-term Recommendations, and Next Steps 48
  Selected Issues 48
  Short-term Recommendations 52
  Next Steps 56
  Developing Statistics and Performance Measures for Networked Services 58

References 59

Appendix A: Summary Analysis of the ARL Scottsdale Meeting Survey 60
Appendix B: E-Metrics Survey Questionnaire 65
Appendix C: ICOLC Guidelines 69
Appendix D: Electronic Vendor Statistical Reporting Capabilities 74
Appendix E: Sample U. Penn Library Reports 83
Appendix F: Yale University Database Usage Statistics Webpage 93
Appendix G: Responses to the Organization Structure Question 94

PHASE ONE SUMMARY

During the ARL E-Metrics Project's Phase One, the study team successfully completed data collection and analysis along a broad range of activities and issues related to measures of networked information resources and services. The results indicate that many libraries are in the initial phases of collecting data on electronic resource use and that libraries need to develop systematic approaches to the measurement of overall library performance. The study also shows that libraries are experiencing serious information management problems due to inconsistent and non-comparable statistics supplied by database vendors. Concerted effort to address this problem is identified as a top priority during the Phase Two of the E-Metrics project.

1. About the ARL E-Metrics Project

The ARL E-Metrics Project is one component of the ARL New Measures Initiative, an effort that tries to respond to the needs for (1) demonstrating the library's impact in areas important to an institution and its stakeholders, and (2) maximizing the effective use of resources by benchmarking best practices in order to save or reallocate resources.

The ARL E-Metrics Project supports an investigation of measurement of library performance in the networked information environment. ARL has had limited success in collecting data on expenditures for electronic resources over the last six years but a more comprehensive investigation is made possible through this project. The 24 ARL libraries listed in Exhibit 1 are contributing financial and staff resources (listed in Exhibit 2) for this exciting undertaking. This project is under contract with Florida State University's Information Use Management and Policy Institute and is directed by Charles R. McClure, Wonsik "Jeff" Shim, and John Carlo Bertot under the leadership of project co-chairs, Sherrie Schmidt, Dean of University Libraries, Arizona State University Library, and Rush Miller, University Librarian and Director.

Information on this project and related activities is located at:

ARL E-Metrics Project: http://www.arl.org/stats/newmeas/e-metrics.html
ARL New Measures Initiative: http://www.arl.org/stats/newmeas/newmeas.html
ARL Expenditures for Electronic Resources: http://www.arl.org/stats/arlstat/#sup

Exhibit 1. ARL E-Metrics Participating Institutions

University of Alberta
Auburn University
University of Connecticut
University of Illinois-Chicago
University of Maryland-College Park
University of Nebraska-Lincoln
University of Pennsylvania
University of Pittsburgh
University of Southern California
Arizona State University
University of Chicago
Cornell University
University of Manitoba
University of Massachusetts
University of Notre Dame
Pennsylvania State University
Purdue University
Texas A&M University
Virginia Polytechnic Institute and State University (Virginia Tech)
University of Western Ontario
Yale University
University of Wisconsin Madison
Library of Congress
The New York Public Library, the Research Libraries

Exhibit 2. ARL E-Metrics Project Participants

ARL Library	Contacts
University of Alberta	Ernie Ingles*, Karen Adams, Kit Wilson, and Ernie Howe
Arizona State University	Sherrie Schmidt* and Kurt Murphy
Auburn University	Stella Bentley* and Glen Anderson
University of Chicago	Martin Runkle* and James Mouw
University of Connecticut	Brinley Franklin*
Cornell University	Sarah E. Thomas* and Christian Boissonnas
University of Illinois-Chicago	Sharon A. Hogan* and Deborah Blecic
University of Manitoba	Carolynne Presser* and Susan Miller
University of Maryland-College Park	Charles B. Lowry*, Irma F. Dillon, and Betty Day
University of Massachusetts	Margo Crist* and Gordon Fretwell
University of Nebraska-Lincoln	Joan Giesecke* and Beth McNeil
University of Notre Dame	Jennifer A. Younger* and Jo Bessler
University of Pennsylvania	Paul H. Mosher*, Joe Zucca, and Michael Winkler
Pennsylvania State University	Nancy L. Eaton*, Kimlyn Patishnock, and Sally Kalin
University of Pittsburgh	Rush G. Miller*, Pamela Vance, and Fern Brody
Purdue University	Emily R. Mobley* and Nancy Hewison
University of Southern California	Jerry D. Campbell* and Joyce Toscan
Texas A&M University	Fred M. Heath*
Virginia Tech	Eileen Hitchingham* and Paul Metz
University of Western Ontario	Joyce C. Garnett* and Lorraine Busby
University of Wisconsin Madison	Kenneth Frazier* and Sandra Guthrie
Yale University	Scott Bennett*, Ann Okerson, and Kimberly Parker
Library of Congress	Dianne Kresh* and Barbara Morland
The New York Public Library	William Walker* and Ann Thornton
Association of Research Libraries	Duane Webster* and Martha Kyrillidou

* Director or Dean of Libraries

2. Organization of the Report

This report summarizes the activities and findings during the first phase and is organized as follows:

Part 1: Introduction to the E-Metrics Project
- Section 1 provides a general discussion of problems and project goals.
- Section 2 discusses related projects and studies that address the same or similar problems.
- Section 3 is devoted to description of the Phase One objectives and goals.

Part 2: Phase One Methodology
- Provides information concerning data collection methods, logistics and data analysis.

Part 3: Summary of Findings
- Section 1 describes the results from the E-Metrics survey conducted during August 2000.
- Section 2 provides comparison of major 12 vendor reports in terms of reported statistics and delivery methods.
- Section 3 provides the findings from the site visits.

Part 4: Conclusions and Next Steps
Provides preliminary suggestions based on the summary findings and directions for the remainder of the project.

PART ONE: INTRODUCTION

1. E-Metrics Project Overview

Research libraries are increasingly concerned about the difficulty they face in describing their performance in providing electronic information services and resources. This concern grows from lack of reliable and consistent statistics that can describe how successful libraries are in fulfilling user needs in the fast paced network environment. Several factors that contribute to the seriousness of the problem include:

- **Increased use of electronic resources**. Over the years the expenditure of electronic resources, or at least the proportion of electronic resources to the overall materials budget, has increased significantly. According to the *ARL Supplementary Statistics, 1997-98*, ARL libraries, on average, spent 8.85% of their materials budget on purchasing electronic resources in one form or another. Combined, 100 ARL libraries reported spending a total of $49 million on electronic resources. Without follow-up statistics, it is difficult to tell what kind of trajectory we see in terms of growth of the expenditure. But there is no doubt that the proportion has increased over the last couple of years and will grow in the foreseeable future. There is a substantial frustration echoed in the library community for not being able to have data that show at least the usage of these resources. At a minimum, ARL libraries need a range of data about the use of electronic resources to justify the growing expenditure.

- **Impact on traditional resources and services.** Electronic resources and delivery of information electronically, most commonly over the World Wide Web (WWW), are not simple, independent add-ons to the existing library collections and services. Libraries want to know how the introduction and proliferation of electronic materials affect the use of existing print based collection, overall role of the library, user behaviors, and the value that libraries can offer to the user community including supporting institutions. Without specific data, it is not possible to make informed decisions that can adequately respond to both internal and external needs.

- **Enabling peer comparison**. One of the important aspects of collecting data is to be able to make reasonable comparison among peer institutions. It is not possible to accomplish such comparisons without agreeing on a set of measures and definitions to be used across the institutions. Benchmarking is not limited only to the common statistics and measures we try to collect. There is a need to look at the processes and procedures that other libraries adopt to deal with the problems in the hope that libraries can learn something useful that can benefit themselves.

- **Common data to support goals and objectives**. If research libraries want to position themselves as effective knowledge managers in the digital age and as providers of educational value and outcome, they should have data that can support their mission, goals, and objectives.

Together, these factors form a basis for the development of standardized network statistics and performance measures.

The first goal of the E-Metrics project has three objectives: (1) To address the problem of developing a set of statistics and measures that can better describe electronic resources and services for ARL; 2) To engage in a collaborative effort with selected database vendors to establish an ongoing means to produce useful statistics on database use, users and services; and 3)

To develop a proposal for external funding to maintain the development and refinement of networked statistics and performance measures. More specifically, the study investigates answers to the following questions:

- What existing techniques and approaches are ARL libraries using to produce statistics and performance measures to describe networked information services and resources? What can be learned from these techniques that could be generalized to other libraries?
- For what purposes and for what audiences are networked statistics and measures necessary?
- Which types of networked services and resources should be described, how should they be defined and operationalized, and how should the data be collected to insure reliable and valid data?
- What performance or quality indicators are necessary to describe the impact and success of such networked services?
- How might such statistics and measures be best reported?
- What linkages are possible to establish between these statistics and performance measures with selected outcomes from higher education?

By bringing a critical mass of ARL libraries to the problem solving process, it is possible to bring a unified approach to the problem for maximum impact. An important aspect of the project is to foster an environment in which libraries work together toward a common goal as they have done successfully in many other areas-it is not possible to resolve, by individual effort, the issues and challenges of network services and resources measurement ARL libraries face today.

The project adopted a three-phased approach to answer the research questions identified above.

(1) **Initial Phase** (May-October 2000): Take inventory of current practices at ARL libraries as to statistics, measures, processes, and activities that pertain to networked resources and services.

(2) **Second Phase** (November 2000-June 2001): Based on the knowledge inventory and drawing from previous initiatives such as ICOLC (International Coalition of Library Consortia), identify and field test an initial set of statistics and measures to assess the degree to which such data collection is possible and the collected data are comparable among member libraries.

(3) **Final phase** (July 2001-December 2001): Proposal of a final set of refined measures to ARL, complete with data descriptions and data collection/analysis/use guidelines.

2. Related Projects and Studies

Libraries of all types recognize the importance of developing statistics and performance measures to describe the usage and uses of their networked resources and services. This importance is evident in the number of initiatives – both national and international – that are underway to assist libraries assess their networked resources and services. These initiatives take different approaches, focus on different types of libraries, and work within various operating environments, but all focus on developing library electronic statistics and performance measures. These efforts include (initiatives with the [Note: researcher involvement] indicate that members of the study team have direct involvement in the research project):

- International Coalition of Library Consortia (ICOLC). Since the mid-90s, an international coalition of libraries – predominantly academic – have been working towards a standard set of definitions for online database services. Current definitions reflect work completed in November 1998 (see http://www.library.yale.edu/consortia/webstats.html).
- Equinox. The Equinox project, funded by the European Union, primarily focuses on developing performance measures for networked services and resources in European academic libraries. This project continues, but has shifted from performance indicators to software development to assist libraries assess their network-based services (see http://equinox.dcu.ie/).
- International Standards Organization (ISO). The ISO continues to develop its library statistics, of which network statistics are a part (see ISO/CD 2789 Information and Documentation – International Library Statistics).
- National Information Standards Organization (NISO). NISO is undertaking a review and update of its *z39.7 – Library Statistics* standard. This review and update will consider network services and resources statistics and performance measures. As of October 2000, the planning committee for the standard is just forming and beginning to meet to develop the review process (see http://www.niso.org). [Note: researcher involvement].
- National Commission on Libraries and Information Science (NCLIS). NCLIS continues its work in standardizing online database usage statistics and reporting mechanisms. This project largely focuses on the public library environment (see http://www.nclis.gov). [Note: researcher involvement].
- Institute of Museum and Library Services (IMLS). IMLS sponsored the researchers to develop national network statistics and performance measures for public libraries. That project resulted in a network statistics manual for public libraries (Bertot, McClure, and Ryan, 2000). This work continues with renewed sponsorship by IMLS and NCLIS to develop a national data collection system for public library network statistics (see http://www.ii.fsu.edu). [Note: researcher involvement].
- Council on Library and Information Resources (CLIR). CLIR has engaged consultants to review the state of the art of network statistics, analysis, and presentation in the academic library and consortia environments. The report is expected in fall 2000, and there is an indication that this work will continue.

All of the above initiatives, groups, and/or research projects focus in some way on the development, analysis, and presentation of library network statistics and performance measures that reflect library needs to describe the use of the network resources and services.

A main issue, however, is the extent to which the initiatives, groups, and/or projects coordinate with one another. While the authors have direct involvement in a number of the above-mentioned initiatives thus providing some cross-fertilization, there is a substantial tendency for the projects to work independently of one another. This is problematic at best, particularly in the area of online database vendor usage statistics. For a host of reasons including vendor cooperation, library reporting requirements, and library management needs (there are others as well, but these are critical), more coordination and cooperation is necessary throughout these projects. It is imperative to avoid the "not invented here" syndrome and to work in unison as much as possible create a standardized approach to definitions and reporting mechanisms.

To the extent possible, the researchers will coordinate with the other groups. This cooperation is dependent on a number of factors, including project team resources, level of effort, and the willingness of the other parties to engage in tandem efforts.

3. PHASE One objectives and Research Questions

PHASE I of the E-Metrics project had two objectives: 1) To identify and describe the current state of the art of statistics and performance measures for networked services and resources in ARL libraries, and 2) To organize an ARL Working Group on Database Vendor Statistics to begin discussions with database vendors.

There are at least two reasons why the study team believes that a knowledge inventory of current practices is the logical starting point for the E-Metrics project:

(1) While it is obvious that ARL libraries are struggling to obtain data describing electronic services, the project should not disregard library accomplishments in this area. Rather, the study team intends to place the project in continuum of those efforts. The ARL-sponsored meeting on New Measures held in February 2000 in Scottsdale, Arizona clearly demonstrated that several libraries are taking an initiative in collecting and reporting data. The study team intends to investigate and highlight some of the current practices that may prove useful to other libraries.

(2) For the formal adoption of statistics and measures, there is a need to identify potential barriers, problems and issues necessary to resolve in producing and using statistics and performance measures As such, PHASE I is an "active listening stage" where we try to understand the challenges and problems associated with the tasks.

The research questions during the PHASE I included:

- What kinds of statistics and measures are ARL libraries collecting to describe electronic resources and services?
- What are the strategies and processes adopted by ARL libraries to collect and process the data?
- For what purposes are statistics and measure being collected?
- What is the extent to which ARL libraries use the data that they collect?
- What are the problems, challenges, and barriers associated with collecting, processing and using network statistics and measures?
- How can we identify best practices among ARL libraries in regards to developing measures and procedures to describe electronic resources and services?

Part Two describes the research methodology adopted by the study team to answer the above questions.

PART TWO: METHODOLOGY

To adequately address the research questions, the study team used the following types of data collection methods:

- Survey questionnaires;
- Site visits to select libraries;
- Sample vendor reports supplied by members of Vendor Statistics Working Group;
- Sample library generated reports obtained from project participants; and
- Follow-up phone/email interviews.

1. Survey Questionnaires

The study team conducted two surveys during Phase I that enabled the research team to collect a range of responses to a same set of questions and thus allow for comparisons across the respondents. The study team analyzed the surveys to compile an inventory of various statistics and measures collected by participating libraries. The responses also provide primary evidence with which to identify libraries for site visits conducted after the surveys.

Scottsdale Survey
(See Appendix A)

The survey was prepared and sent out to the Scottsdale meeting participants by Martha Kyrillidou and Julia Blixrud and responses were compiled by the ARL Statistics and Measurement Program staff.. The data were provided to McClure and Shim by ARL for the preparation of the meeting. Shim made a preliminary summary presentation during the meeting on the main themes in the responses (http://www.arl.org/stats/newmeas/scottsdale/scottsdalehtm/sld001htm).

Of the 35 ARL institutions represented at the meeting, 21 libraries responded to the survey. Also of 35 libraries represented, 24 institutions have decided to participate in the current project. Among those 21 libraries that responded to the survey, 15 libraries are now participants in the project.

The survey asked the following four questions.

1. What do you need to know to make good resource decisions related to the provision of electronic services or purchase of networked resources? What information do you need to communicate to decision-makers about electronic resources?
2. What data do you need to measure the impact of electronic services and resources? Do you have this data available now?
3. What are you currently doing at your institution in terms of measuring electronic services and resources? Describe your current role in developing measures for assessing electronic resources and services.
4. What are your primary goals in participating in this project planning session?

Responses to questions 2 and 3 provide us with some indication of data collection activities at responding libraries. Responses to the first question also show the level of sophistication or articulation on the issue that the respondents or the institutions have.

Since the Scottsdale survey was not part of the actual E-Metrics project, this report does not present findings from that survey. The data, however, contain some very important information that may prove useful for the E-Metrics project and for others in the future. Therefore, we provide a somewhat detailed summary of the responses in Appendix A.

E-Metrics Survey
(See Appendix B)

The survey's purpose was to gain focused data in the following categories:

- Currently collected measures;
- Data use in terms of specific decision making;
- Issues and challenges facing libraries in the data collection efforts; and
- Areas in which libraries have best practice related to network measurement activities.

The survey also asked the libraries to include sample reports pertaining to electronic resources and services-Note that the second and third categories were asked as open-ended questions.

More specifically, the survey asked the respondents to list measures that they currently collect in the following five categories:

- Measures related with patron accessible resources;
- Measures related with patron use;
- Measures related with users;
- Measures related with cost; and
- Other measures that cannot be classified above but important to electronic resources and services.

The survey also asked the respondents to specify for how long each measure has been collected, how frequently, and the name of the entity if the data are requested by someone or an entity both inside and outside the library.

The study team circulated a draft version of the survey among the participants of the ARL Working Group (WG) on Database Vendor Statistics meeting in Chicago on July 7, 2000. A revised pre-test version of the survey was sent to 4 libraries that agreed to take part in the testing. Based on the comments from the pre-test, the study team distributed the final version to the project participants on July 31, 2000 in an email attachment. Of the 24 e-mailed surveys, the study team received 22 completed surveys, primarily via e-mail.

Survey responses were aggregated in an Excel spreadsheet for analysis. For measures collected, two research assistants read the responses and constructed an authority list for each category where applicable. They then went back to each response to tally it up according to the authority list. The analysis and summary of the frequency of data collection, the time data collection began, and the person or organization who requested the data proved difficult due to the variation in responses. As such, the study team created simple frequency tables for these types of information.

Through an iterative process, the study team developed a data-derived taxonomy in an effort to put responses to open ended questions (decision-making and issues) into some context. Responses were then assigned to specific classes in the taxonomy.

2. Site Visits

The study team used the following approach to selecting the best practice sites:

- Reviewed the list of respondents who expressed interest in the benchmarking process;
- Reviewed the documents provided by those libraries seeking best practices;
- Considered factors such as the type of library (public v. private), location, and unique situations that the candidate library is expected to bring to the mix; and
- The sample for the site visits was limited to the active participants of the project.

Readers should note that the best practices that are identified and documented in this report are snapshots of a point in time. As libraries develop better ways to deal with the network measurement issues, today's best practices may well become less than best or average practices. Indeed, one of the goals of benchmarking is to push the limits of current practices and to continually challenge organizations to perform more effectively and efficiently.

The study team used the following criteria to identify candidates for site visits.

- Willingness to participate as indicated in the E-Metrics survey;
- Evidence that the library engages in some level of data collection; and
- Knowledgeable staff with whom the study team could meet.

Based on the above criteria, the study team identified the following libraries as site visit candidates:

- Virginia Tech (VPI & SU) Library;
- University of Pennsylvania Library;
- Yale University Library; and
- The Research Libraries at the New York Public Library.

The study team sent invitations to the candidate libraries early August so that the visits could take place no later than the end of August to avoid any problems with libraries preparing for the fall semester. All the identified libraries accepted the invitations

Exhibit 3 presents the list of questions mailed to the institutions in advance of the site visit to facilitate discussions between the study team and site visit library staff.

The site visits occurred during the week of August 21, 2000. Shim conducted all site visits as outlined in the study proposal. Each visit lasted on average about 4 hours and consisted of 2-3 sessions of group discussions centered on the questions in Exhibit 3. During the visits, Shim collected relevant materials such as annual reports and library internal documents.

Exhibit 3. Site Visit Discussion Questions

Questions to library administrator

1. Why are you collecting information about electronic (digital) resources and services?
2. What kinds of data, measures, or statistics will best serve your needs?
3. How important or how critical is it to have that information? What kinds of additional resources you are willing to spend to obtain that information?
4. What is the organizational structure and procedures for collecting and reporting data, measures, and statistics related to networked services and resources?
5. What are some of the biggest challenges in producing and using the information? Tell us how your library solved or tried to resolve one of the challenges.
6. How do you compare data collection and use activities related to digital materials with those related to print materials?
7. Do you see any changes in the administration's view of the library's role as the library increases the portion of digital materials and becomes more technology-oriented?
8. Please tell us about any immediate and long-term plans related to measures and indicators of electronic services and resources.
9. Can you provide us with any written reports or studies related to producing networked data, statistics, and measures? Are there any reports or other useful information on your website about this topic?

Questions to librarians/staff members

1. Can you describe in some detail what's your involvement in producing statistics and measures relating to electronic services and resources?
2. Could you discuss your approach or methodology? What tools, technologies, and software do you use?
3. What steps do you take to try to ensure the collection and reporting of valid and reliable data?
4. Can you describe the vendors with whom you work to obtain data and reports and discuss their level of interest and assistance? Which vendors and individuals have been most helpful to you? Which have been least helpful?
5. Can you describe procedures and possible interactions with vendors that might assist in getting the necessary data from them?
6. What are the biggest challenges or problems you face to produce the measures and statistics? Please tell us how you solved or tried to resolve a specific challenge.

3. Vendor Reports

During the July, 2000 ALA annual conference in Chicago, the ARL Working Group (WG) on Database Vendor Statistics had its first meeting. The WG is a smaller set of study participants (13) that focuses on the statistics describing use, users, costs, etc., of vendor databases. During the meeting, members of the Working Group were asked to submit a list of vendors with which they spend more than $20,000 for annual subscriptions and also supply sample vendor reports and other information relevant to vendor statistics.

The study team received the vendor lists from nine libraries. Among these libraries, some sent us the top ten vendors, while others included a fairly comprehensive list of database vendors with whom they have subscriptions. The study team reviewed the lists and identified the 12 most frequently listed. Exhibit 4 lists the names of vendors whose usage statistics report was analyzed in this study.

Exhibit 4. List of Compared Vendor Reports

Academic Press/IDEAL	Bell & Howell/ProQuest	Ebsco
Elsevier/ScienceDirect	GaleNet	HighWire
ISI/Web of Science	JSTOR	Lexis-Nexis
OCLC/FirstSearch	Ovid	SilverPlatter

Given the fact that research libraries deal with several dozens of database vendors, the list in Exhibit 4 may seem short. However, the list represents a fair portion of the major vendors that have business with the academic library community. Also, it is not feasible to summarize the entire variety of vendors and their statistics.

The study team reviewed the sample vendor reports sent by libraries in terms of the statistics provided, format of the reports, frequency of reporting, statistics access, and other information that can provide a concise summary of vendor offerings. The study team also tried to match statistics from each vendor to the ICOLC guidelines as libraries and vendors both seem to be leaning toward the guideline as a current yardstick of how successful a vendor can be in delivering usage statistics. The ICOLC guideline is attached in Appendix C for easy reference.

Finally, the study team reviewed the definitions, descriptions, or explanations of the usage statistics provided by the vendors along with the actual reported statistics. This provides data regarding how much agreement there is among library vendors as to what the reported measures mean.

One caution regarding vendor statistics is that they are moving targets. At the time of this writing, some vendors may have changed some aspect of their reports or reporting mechanism. Thus, the findings presented in this report provide a snapshot at a point in time, and serve as providing a standardized review of today's vendor statistics.

The Washington State Library compiled a table that describes database vendor's capability (or plans) in terms of providing the ICOLC compliant statistics for the Washington Library Association annual conference, May 17-19, 2000 in Tacoma, Washington. The document is reproduced in Appendix D. The listing is especially useful as an overview of vendor statistics.

4. Limitations of the Study

The study sample consists of a self-selected group of 24 libraries. Thus, there is substantial willingness on the part of libraries in the group to cooperate in the data collection activities partly because of the vested interest. At the same time the findings in this report may not represent the ARL member libraries as a whole. Rather, as it will be explained in the findings section, there are unique local operating environments and needs that each ARL library faces as it attempts to measure its electronic resources and services.

PART THREE: SUMMARY OF FINDINGS

This section of the report is organized by the findings generated from the E-Metrics survey conducted during August 2000, vendor reports, and sites visits.

1. E-Metrics Survey Findings

The findings are presented in the order and form of the original survey. The intention of the survey was to obtain the range of measures currently collected among participating ARL libraries rather than an exhaustive list. Also, the survey did not ask the libraries to supply the definitions of the measures that they reported on the survey form. As such, there may be cases in which different measures mean essentially the same thing or vice versa.

Data Collection

1) Measures of Patron Accessible Resources (e.g. # of electronic database titles served, # of library web pages in service, # of e-books, # of full-text e-journals, # of librarians providing electronic reference.)

Table 1. Collected Measures on Electronic Resources by Number of Mentions

Collected Data	No. Mentioned
Number of electronic database titles	17
Number of electronic (full-text) journals	16
Number of electronic books	6
Number of library web pages in service	4
Number of new electronic titles	3
Number of cancelled electronic titles	2
Number of electronic resources	2
Number of computer files	1
Number of networked CD-ROMs	1
Number of librarians providing electronic reference	1
Number of public workstations available	1
Number of classes on electronic resources	1
Other	3

As illustrated in Table 1, most libraries seem to keep track of various types of electronic materials. In terms of licensed materials, electronic databases and electronic full-text journals represent the bulk of the measures related to electronic collection. There were two libraries that used electronic resources to denote perhaps electronic databases. The same applies to one library that collects the number of computer files. Most libraries that collect the number of electronic databases also said they keep separate counts for full-text journals. Three libraries gather information about the number of databases added or deleted periodically.

Only six libraries reported that they collect information about electronic books (e-books). At this point, it is not clear whether e-books include only those e-books that are commercially available through companies like NetLibrary or scanned copies of books generated locally.

Four libraries report that they collect some information about the size of their web contents. However, a page in one library can be quite different from a page in another library. This information can provide not only a trend-line in terms of the amount of information in the local context but also some crude measure of staff productivity. Among the less frequently mentioned measures is the number of networked CD-ROMs (1). This may be interpreted as an indicator that CD-ROMs are gradually disappearing in the library and that their role as a major networked resource in research libraries is diminishing. Also only one library reported that it keeps the public workstation count available in the library. The survey did not produce data that details the number of public workstations available in ARL libraries over the years.

The measures reported in the 'other" category include the number of digitized images, the number of print or CD-ROM indexes migrated to the web and the number of locally mounted database records. All three measures were reported from the same library

In terms of the collection frequencies of these measures, libraries provide these numbers annually in most. While unclear, the study team suspects that many libraries use the information for reporting, both internal and external, purposes. Only about one-third of the libraries (8) indicated that they collect the key measures monthly. A few libraries said they obtain the information quarterly.

There is a wide variation in terms of when the data collection began for different measures in the same institution as well as for the same measure among reporting libraries. For instance, one library reported that it started collecting the number of electronic databases since 1991, the number of electronic journals since 1995 and the number of web pages in service since 1998. Among libraries that collect the number of electronic databases, 9 out of 17 libraries indicated that they started collecting the data after 1997. The earliest goes back to 1990 and 1991. Three libraries did not specify when they began data collection.

Seven libraries report that they collect the data to fulfill requirements of external organizations such as ARL and CARL. It appears they are referring to the annual *ARL Supplemental Statistics* that collects data on expenditures for electronic resources (http://www.arl.org/stats/arlstat/#sup). Almost an equal number of libraries (6) said that the data were required by library administration or staff. At least one library was able to list a rather comprehensive group of consumers of the collected information: University and Library Administration, Library Committee responsible for networked electronic resources, Serials Department, Libraries Electronic Technologies and Services (LETS), bibliographers, and Library Unit Heads. Only one library reported that the information is required as part of strategic planning efforts.

2) Patron Use Measures (e.g. # of logins or visits, # of library web pages accessed, # of documents downloaded, # of electronic reference service transactions.)

It is quite difficult to summarize the responses to this category given the wide range of measures reported that are likely to be confounded with seemingly inconsistent use of terms.

As far as the vendor materials are concerned, nearly all libraries responded that they collect usage statistics as provided by vendors. These include sessions, searches, downloaded records, rejected logins (that is turn-aways), and so on. Clearly, it is not possible to collect these measures uniformly across the database vendors if available at all.

Several libraries seemed to have a formal report that summarizes various measures available either from the vendors or internally. According to a sample report sent by one library, it compiles a quarterly ER (Electronic Resources) Usage Report by database, including measures such as sessions, connect time, searches, records and articles (downloaded or viewed), and lockouts. Obviously there are a number of empty rows in the report. Several other libraries also sent sample reports that are less formal but nonetheless attempt to fill in as much information as possible using a common set of core measures supplied by vendors.

A handful of libraries (4) seemed to have some form of a click-through mechanism where they capture "attempted" log-ons to electronic databases and full-text journals from their electronic resource pages. One library goes even further to map these click-throughs to schools and departments based on IP domains associated with campus units.

Most libraries capture information about library webpage usage through programs such as *WebTrends* and *Analog*. However, when we examined the sample reports from select libraries, they are mostly raw information, such as page access, generated by the software programs. The study team did not see good examples of succinct summary of the collected information other than a few factoids such as top-ten most visited pages (or areas) and peak use period.

Other use measures worth mentioning include the number of electronic reference transactions, the number of documents downloaded from electronic reserve, and the number of electronic document delivery requests (e.g., from Current Contents database). About half of libraries (10) reported that they collect the number of electronic reference transactions.

In terms of frequency of data collection, an overwhelming number of libraries reported that they collect statistics monthly. This obviously coincides with the fact that many database vendors supply monthly usage statistics and the fact that many library system log files (e.g., web statistics) are also captured on a monthly basis. The only major exception is the number of electronic reference transactions with which 4 out of 10 libraries that report the measure said they collect it yearly as opposed to collecting it monthly.

Again, it is quite recently when most libraries began collecting various usage statistics such as web access statistics, licensed database use statistics, the number of electronic reference questions. We can see that libraries first collected input oriented information such as database titles and gradually moved to collecting usage statistics as they received information from database vendors and some needs (such as budget justification) required them to have these types of information.

While more than two thirds of libraries were required to report various electronic resource related measures, only about one third of the libraries said they collect usage statistics because someone requested them. The person who is mostly likely to request data is either collection development manager or individual collection development staff members. This tells us that usage statistics, at the current moment, serve primarily for collection development activities such as renewal/cancellation of subscription.

3) Measures of Users of Electronic Resources and Services (e.g. % of undergrads who have used the e-books, % of grads who have used the electronic reference service, # of users by type of services)

Libraries all agree that they do not have a way to distinguish individual users. This is a serious problem as libraries strive to collect such crucial information as user penetration as an indication of the library providing value to the user community.

With the introduction of OPACs, libraries were able to track who was borrowing what materials with a reasonable amount of effort. Now the Web, on which most electronic services are carried out, presents a substantial obstacle as far as libraries' ability to know about their users. Obtaining this information is not impossible. As a matter of fact, the same technology that enabled libraries to have information on-line can be used to track users and their activities. However, at the moment, libraries are very reluctant to put any obstacles, such as forcing users to enter library card number and a few clicks to authenticate themselves, that may hinder use of electronic materials. Also, this has to do with the fact that many licensed materials are essentially IP validated to ease the burden on the user to authenticate themselves to each database and also on the database vendor to manage access with too much overhead.

The only exception where a comprehensive set of data are available is two libraries tracking the number of uses originating from various academic units including libraries, computer labs and other buildings identified with a set of IP addresses. In rare instances, locally mounted databases can keep track of users by type (faculty, undergraduate, graduate, and staff). There is only one mention of that kind of setup.

Otherwise, libraries collect partial information of bits and pieces from at least several sources. Three libraries reported that they ask the users to identify themselves (by type) when they submit electronic reference queries. One library conducted a user survey on electronic resource use where users were identified by type. Another library said they monitor user comments submitted electronically as to what type of users.

In two instances the use of a proxy server for obtaining user information is mentioned. One library has information about users by remote vs. on-campus connections. The other library has not yet collected information but plans to use the proxy server log to obtain user demographics.

4) Cost Measures (e.g. $ per electronic document delivered, cost of database subscription fee, expenditures for electronic journals)

Table 2 shows the frequency of cost measures reported in the survey responses. Many libraries collect the overall cost for electronic database subscriptions. All libraries, except for one library with no response for this category, reported that they have this information. Some libraries (8) went even further to differentiate the costs for electronic full-text journals.

Table 2. Measures of Cost

Collected Data	No. Mentioned
Total costs of database subscriptions	21
Expenditures for e-journals	8
Cost per electronic document delivered	4
Cost per search	3
Average cost per database subscription	2
Cost per login	2
Other	16
No response	1

Approximately less than half of the libraries (9) reported that they link the cost per some kind of usage measure such as the number of searches, logins or documents delivered. In some instances, the information is available from the vendor as indicators of value or cost savings.

Some libraries commented that calculating cost per use is like comparing apples and oranges: they are incomparable. While this may be true, we also suspect that libraries fear that producing the cost per use might be uncomfortable if the ratio turns out to be too expensive.

There are a variety of measures collected in individual libraries. One library reported a staggering range of cost measures that include the percentage of collections budget spent on electronic resources, dollar amounts by college, cost projections, dollar amounts invested in digital library, web development, electronic resource spending per student, and ratio of paper/electronic journals costs. All these measures are incorporated in their library strategic planning document. There was at least one other library that reported projected cost. Some libraries differentiated one time costs (such as JSTOR membership) and on-going subscription costs. One library said they keep the cost for electronic books separately. One library said they collect information about internal and external sources of funding for electronic resources.

There are some similarities between the patron accessible resources measures and cost measures in terms of how frequently libraries collect the information, when they began collecting the information, and who asked for the information. Again, except for a handful of cases, many libraries report cost information annually, perhaps for annual budget preparation. Where data are reported monthly or quarterly, it appears that the libraries have a special electronic resource cost report type of arrangement that is reviewed by a committee in charge of database renewal in addition to annual budget materials where these numbers are used.

It seems collecting cost measures started roughly at the same time or period when libraries started counting the number of electronic resources.

Collection of cost measures at 6 libraries was required as part of *the ARL Supplementary Statistics* survey on the topic (http://www.arl.org/stats/arlstat/#sup). Nine other libraries said the information was requested by either library committee or management (7) or outside government body (1) or for strategic planning requirement. One library said that they reported the total cost of database subscription to a magazine.

5) Other Measures related with electronic resources and services (such as service quality, the effects of library use on research and instruction or the percent of library users satisfied with libraries services)

This category served to capture any on-going data collection efforts on user satisfaction, quality and value of services. However, it appears that the responses were not limited to electronic services. Instead, what emerges from the responses is a list of tools, shown in Table 3, libraries use to measure some aspect of the aforementioned aspects of library service.

Table 3. Sources Used to Obtain Information Regarding Service Quality and User Satisfaction.

Instrument Types	No. Mentioned
User satisfaction survey	7
LibQUAL+	3
Focus Group	2
Library Class Evaluation	2
User Panel Feedback	1
User Forum	1

Most of the instruments are used on an 'as needed' basis or irregularly. Only one library reports that it has a biennial user satisfaction surveys. The other exception is evaluation after library instruction on electronic materials that seems under represented here. Three libraries mentioned participation in the ARL LibQUAL+ project as an effort to collect information regarding service quality. Focus groups, user panel feedback and user forum represent important but less frequently utilized ways of collecting data.

In addition to the instruments mentioned in Table 3, there were a few items that some libraries are measuring about electronic resources. One library is collecting dollar amounts saved (cost avoidance) as part of the consortium report. What is not clear is whether the information is the cost savings at that institution or at a consortium level. One library listed the number of students who took library's online tutorials and courses as a measure in the other category.

Data Use

1) Level of communication

The survey requested that libraries indicate the people or entities with whom they report the collected data on electronic resources. Table 4 summarizes the result along the provided categories.

Table 4. Dissemination of Data

Among library managers	Among library staff	With supporting institutions	Others
100%	95%	82%	32%

The "other" category included ARL (2), outside accreditation body (1), external funding agency, consortia groups (1), magazine (1) and public (1).

On the surface, it seems information on electronic resources and services (to the extent it is available) is being communicated widely within the library and within the parent organization. Without specific information about what kinds of information, medium (e.g., annual reports, official internal report), and frequency, it is difficult to ascertain the level of communication that takes place for measures and statistics of electronic resources.

2) Use of Collected Data for Decision-Making

We also asked the libraries to elaborate on the kinds of decision-making based on collected measures and statistics. To help summarize the responses, we developed the following taxonomy in Table 5.

One of the immediate uses of measures of electronic resources is in the area of decision making related to external resource contracts. Fourteen libraries specified that they use electronic resource statistics to make electronic database subscription decisions. Among those libraries, 8 reported that they use turn-away or lock-out (logins exceeded simultaneous user limit) data to change the simultaneous user (S/U) licenses. It is not clear whether the information is used to both increase and decrease the number of S/U licenses. Three libraries responded that usage statistics of electronic resources affect the subscription decision of the same or similar counterpart print materials.

In the reporting and communication category, seven libraries report that data are being used for budget related activities. It is interesting to note that only one library specifically mentions the use of such data in their annual report. The library wrote:

> The university administration has little interest in frequent statistical reports, but we make sure that the overall extent of our e-resources and bottom-line summaries of the extent of their use feature prominently in our most significant reports [annual report] to them.

Table 5. Taxonomy for Decision-Making Instances Affected by Information on the Use of Electronic Collection.

Main Category	Specific Category	Frequency
External Resource Contract	Journal renewal/cancellation	3
	Database renewal/cancellation	14
	Changes in simultaneous/user Limit	8
Reporting and Communication	Budget request, justification, and presentation.	7
	Annual report and other similar summary report	1
	Strategic planning	3
	Institutional comparison	1
Service Assessment & Improvement	Redesign of web pages	9
	Marketing of collections and services	3
	Instruction and training	4
	Changes in staffing	4
	Assessment of existing collections and services	9
	Assessment of pilot (trial) collections and services	1

Three libraries use the data in strategic planning process and related documents. There was only one library that mentioned specifically institutional comparison as one of the uses of the data.

In the service assessment and improvement, nine libraries said they use the data to redesign library webpages. We suspect the high number of responses in this category might have been influenced by the example given in the question. The same number of libraries responded using a more generic phrase that can be summarized as assessment of existing collections and services. Only one library said that it uses the data to evaluate pilot services.

There were hints in the responses that some of the decision making activities are performed only on occasion (as opposed to regularly or systematically), in an ad hoc (as opposed to planned) manner. The following comment from one library will illustrate the point.

> At this point in time we have neither sufficiently comprehensive statistics nor the necessary processes in place to use these statistics to systematically evaluate our collections and service.

Nonetheless, libraries use the data to make improvements in service marketing (3), instruction & training (4) and staffing.

Issues Important to Statistics and Measurement

The survey asked the respondents to list the three most important issues related to collection of statistics and measures to describe networked resources and services. Eighteen libraries responded to the question, an overwhelming number of responses were related with problems associated with current vendor reports.

Table 6 describes the summary of these responses. The main category is broken into two sections: one that has to do with data collection and the other with data processing and use. The data collection category is further divided into issues related with vendor reports and others.

Table 6. Summary of Issues Related to Measures of Electronic Resources and Services

Main Category		Specific Category	Frequency
Data Collection	In regard to vendor statistics	Lack of consistent definitions	9
		Lack of comparable measures	12
		Lack of standardized reporting method	10
		Lack of detailed, granular data	3
		Lack of useful data	3
		Availability of data	2
		Timeliness of data	1
		Effort to collect data	4
	Other	Difficult to measure web access	1
		Difficult to aggregate data among branch libraries	1
		Lack of qualitative data	1
		Lack of information about users	3
Data Processing and Use		Lack of supporting (technological and human resources) to facilitate data processing	2
		Urgency to justify expenditure	1
		Difficult to summarize or interpret data	2
		Inability to relate use of electronic materials with their physical counterparts	1
		Comparison with peer institutions	1
		Inability to link data to decision making	1
		Inability to link data to quality of service	1
		Inability to link data to outcomes	2

The data clearly show that first of all libraries want consistent, comparable data delivered in a standardized method. The responses read like a scripted answer whenever you ask "what's wrong with statistics on electronic resources?" They suggest that vendors are to blame. A high level of frustration with the contents of vendor supplied usage reports and the way they are delivered were common responses. One respondent summed it up saying "for the most part, vendors provide what they want" not what libraries want.

On the other hand, one library expressed some optimism amid frustration about the vendor reports. "Despite these frustrations, vendors are making progress in moving towards simpler and more accessible reports and we are pleased that for our most important resources port contention [turn away] is reported to us."

Four libraries expressed concern that it takes too much time and effort to collect and compile various vendor statistics. Some pointed out the issue of not having useful data (3) or data with enough detail (3). Two libraries said some vendors provide no statistics at all. One library complained that vendor reports are not timely.

Among data collection issues other than those related with vendor reports, the lack of information about users and user behaviors tops the list of responses. One library said that aggregating measures across branch libraries on campus is a difficult thing to do given the fact that some libraries operate either independently or under different reporting environment. Another library expressed concern that collecting even the seemingly simple thing such as webpage access proved to be a difficult task due to technological and organizational complexities. Finally, one library said that lack of qualitative oriented information such as ease of access, quality of sources, and availability is an issue.

The responses suggest relatively low responses related to data processing and use. While this may have to do with the way the question was phrased, it does beg the question "are libraries doing enough?" At least two libraries commented that lack of organizational support in terms of technical and human resources is a major hindrance to the measurement effort. Two other libraries said they are having difficulty interpreting and summarizing the collected data. These kinds of responses acknowledge the fact that even when libraries receive reasonably satisfactory reports from database vendors, a lot of work still remains. Four libraries pointed out their inability to link data to other important issues such as decision-making (1), quality of service, and educational outcome (2).

Willingness to Participate in the Benchmarking Process

When the survey asked libraries whether libraries are interested in the formal benchmarking process, we provided one criterion for best practice that there has to be a systematic process put in place for a prolonged period of time (at least 6 months).

Table 7 shows the number of essentially self-selected best practices libraries in the provided areas of expertise.

Table 7. Number of Self-chosen Best Practices and Their Areas of Expertise

Category	No. of self-selected best practice libraries
Users of networked services and resources	2
Uses of networked services and resources	6
Quality of networked services and resources	2
Cost of networked services and resources	3
Staffing and training	3
[Other] Life Cycle Funding Analysis	1
[Other] Training/programming for increased use	1

Summary of Survey Findings

Analysis of the E-Metrics survey responses reveals a wide range of data collection and use activities among project participants. It appears that measures related to patron accessible resources and costs are more consistently and systematically collected than measures related to electronic resource use or users of those resources. Due to often inconsistent and non-comparable nature of vendor supplied statistics, libraries seem to have a difficulty to track overall electronic database usage and its patterns.

Collected data seem to be shared widely among library staff and with supporting institutions. However, the types of media information is communicated and the nature of the information sharing are now shown in the data. Data are most often used to make purchasing decisions for licensed vendor materials. People also indicated various uses of collected data for the purpose of internal and external reporting and service assessment and evaluation.

Responding to what are the most important issues related to performance measurement of networked resources and services, the majority of respondents cite the lack of consistent and comparable statistics from database vendors as the most serious problem. Relatively few respondents cite problems associated with the library's inability to process and utilize collected data.

2. Comparison of Vendor Reports

We analyzed the sample vendor reports for 12 different vendors to investigate what they offer and how they deliver reports. As we explained in the methodology part, the vendors were chosen from the lists submitted by the members of the ARL Working Group on Dadabase Vendor Statistics. Generally speaking, these vendors represent a subset of expensive and/or most widely used databases among more than several dozen database vendors with which individual libraries have business relationships. The 12 vendors represent different types of electronic database services available on the market. For example, Academic Press/IDEAL and Elsevier/ScienceDirect are providers of scholarly journal contents. GaleNet is a provider of indexing and reference tools. ISI/Web of Science is a citation database.

Comparing vendor statistics reports proved to be a challenging task. First, many reports were written in such a way that it was difficult to decipher what exactly the reported statistics mean. Second, the reports are evolving constantly as the vendors change both the content and the format in attempts to improve their service. We advise our readers to refer to the information compiled by the Washington State Library in regard to current and planned vendor reporting capabilities (attached in Appendix D).

The analysis consists of three main areas: 1) Overall comparison of reported measures and delivery, 2) Availability (or lack)of definitions, and 3) Vendor compliance to the ICOLC guidelines.

The purpose of the following comparisons is to show and document a wide range of reporting practices and to develop strategies in planning collaboration with major vendors. As already pointed out, there are many vendors who do not provide any statistics at all. This poses a more serious problem, as libraries do not have information whatsoever to evaluate the effectiveness of the products. Overall, larger vendors are more likely to furnish some type of usage statistics probably because they have technical and human resources to generate reports while smaller providers lack such capabilities.

Overall Comparison of Vendor Usage Reports

Table 8 summarizes the vendor reports in terms of content (reported statistics, statistics organization) and report delivery (frequency, method of delivery, and format). For example, Academic Press/IDEAL provides the number of sessions and the number of document types (such as abstracts, full-text articles) accessed organized by journal title. The report is compiled monthly and accessible on the company's website in Excel spreadsheet format. In some instances, reports are available in two different methods. The ProQuest usage statistics are available both in print and on the web (in this case, libraries can request the detailed report sent as an email attachment).

Table 8. Comparison of database vendor reports

Vendor	Reported Main Statistics	Organized By[§]	Report Format & Delivery	Frequency[¶]
Academic Press IDEAL	Sessions Document types accessed or downloaded	By journal title	HTML and Excel, Web	Monthly and Quarterly
Bell & Howell ProQuest	Documents accessed by type	By journal title and by database	Print Text, Email (Detailed) HTML, Web (Summary)	Monthly or range of months
Ebsco	Searches Hits Documents by type Emails sent	By database and by IP address	HTML, Web Text or HTML, Email	Monthly or range of months
Elsevier ScienceDirect	Searches Requests of webpages Journals browsed Articles accessed Help files accessed	By journal title (Subscribed vs. Unsubscribed)	MS Word, Email	Monthly
GaleNet	Searches Entries retrieved Help files used	By journal title	HTML, Web Text, Email	Monthly
HighWire	Searches Document accessed by type Top 10 articles viewed	By journal title	HTML, Web	Monthly and Quarterly
ISI Web of Science	Queries Sessions Average length Maximum concurrent users Turn-aways	Not Applicable	HTML, Email	Monthly
JSTOR	Searches Browsing (by sections of record) Viewing (articles, pages) Printing by types of formats	By journal title, discipline, IP	HTML and text, Web	Monthly
Lexis-Nexis	Searches Documents retrieved	By database By day and by hour of the day	HTML and comma separated (CSV) file, Web	Monthly
OCLC FirstSearch	Sessions Session turn-aways Searches Documents ordered Port usage	By database	HTML, Web	Monthly
OVID	Sessions Time Sets View, print and save	By database	HTML, Web	Can be specified down to a minute
Silver Platter	Total connection time Successful logins Characters delivered Items browsed	By database	Text, Email	Monthly

[§] Statistics organization: by journal title (or journal name by some vendors) means statistics are reported at the journal or newspaper or magazine level, by database means statistics are reported at the group of journals or source files.

[¶] Frequency refers to the report interval. Monthly means the statistics are compiled and reported monthly. Some vendors give an option to specify the range of request period, usually in months.

Findings and issues identified in the comparison are as follows:

- Many vendors offer multiple delivery options. While the HTML format is easily viewed in a browser, text format (ASCII or comma separated) is easier to manipulate using a spreadsheet or database program. In some cases, libraries were not informed of the fact that the same report is available in an alternative form. The case in point: several libraries sent us a print copy of the ProQuest report while other libraries showed us copies of statistics obtained from the vendor website.

- While most other reports provide raw statistics only, JSTOR provides institutional comparison of usage based on the size of institutions. It also provides graphs showing usage trends over time.

- Although not included in the comparison, the timeliness of usage reports was identified as one of the key issues. While majority of the vendors who provide monthly report do so within the following month, some vendors lag several months behind and in some cases reports for a block of months are not available due to the technical failures of the vendor reporting program. It is strongly recommended that the availability of timely (need to be specified) report included in the licensing contract.

- When database vendors provide journal level statistics, they should be arranged in such a way (e.g., alphabetically) to facilitate easy manipulation. If a database product or a journal is broken into several different parts, as in the case of Medline having several blocks of files divided by the database coverage, the total usage for that database or journal needs to be provided.

- When the usage statistics are available on the web, a user ID and a password are required to access the statistics. JSTOR is an exception. It does not require a user ID and password. Instead anyone whose IP address belongs to the eligible IP block for use authentication can request and retrieve statistics. Sometimes, a separate set of ID and password is required to access statistics for each database or journal. HighWire is an example of such case. Currently, it requires libraries to use the same user ID and password to access statistics as well as administer institutional profiles.

- Overall, libraries want usage statistics that are easy to obtain and manipulate if necessary. In other words, there should be less or little burden on the library to process the statistics. Ideally, vendors need to use standardized measures and formats. Another issue has to do with different needs from different libraries. It is strongly recommended that a summary level information be provided to all libraries. At the same time, detailed and granular statistics should be also available to libraries, in ASCII (Text) or comma separated file (CSV) format, who wish to obtain additional information about the use and use patterns.

Provision of Definitions of Measures

One of the most frequently cited complaints about the current vendor reports is the lack of standardized terms for key usage indicators and the lack of definitions. Table 9 shows the availability of definitions, descriptions or explanations of reported measures. It clearly shows that many vendors do not provide information about what the statistics mean. Even when information is provided, it is mere repetitions or paraphrases of a measure (see examples in HighWire, JSTOR, and Silver Platter)

Table 9. Availability of Descriptions of Reported Statistics

Vendor	Definitions or explanations
Academic Press/IDEAL	**Not Available**
Bell & Howell/ProQuest	**Not Available**
Ebsco	**Not Available**
Elsevier/ScienceDirect	**Not Available**
GaleNet (in the statistics web page)	• Searches submitted: This category tracks the number of searches that you have run in this database for the month selected. Each time you submit a search it generates a single "Search Submitted. "If you modify a search and resubmit it that will generate one more 'search run." • Entries Retrieved: This category counts the number of entries that you looked at in this database. If your search returned 15 entries in the search results list, and you retrieved two by clicking on them, you would generate two 'entries retrieved.' If you have retrieved an entry and you click on a hypertext link within that entry to a related entry, clicking on that hypertext link will generate one more 'entry retrieved.'
HighWire (in the statistics web page)	• Searches: The number of searches performed on the search page. • Abstracts and Full-text HTML: The number of abstracts, full-text articles in HTML format viewed. • PDF's: The number of PDF files downloaded.
ISI	**Not Available**
JSTOR (from library submitted copy of JSTOR web page)	The total number of accesses for your institution is divided into several categories: • Browsing: Accesses which may indicate browsing behavior. • Viewing: Accesses which reflect that article pages were viewed online. • Printing: Number of articles printed or downloaded from the printing page in a special printing format. • Searches: Number of searches performed in all journals, and the number of search results lists viewed. • Total: Total number of accesses (browsing, viewing, printing and searches combined).
Lexis-Nexis	**Not Available**
OCLC - FirstSearch	**Not Available**
Ovid	**Not Available**
Silver Platter (in the email)	Explanation of Statistics • Time: total "connection" time to the database. • Num: total number of successful logins to the database. • Chars: total number of characters delivered. • Without abstract: total number of records browsed without an abstract. • Total records: total number of records browsed (including records with an abstract).

Level of Vendor Compliance to the ICOLC Guidelines

The ICOLC guidelines are widely recognized as the acceptable practice by both the library and vendor communities. The guidelines, drafted in November 1998 by the International Coalition of Library Consortia (ICOLC), have the following five use elements that a vendor report needs to provide:

1. Number of queries (Searches) categorized as appropriate for the vendor's information. A search is intended to represent a unique intellectual inquiry. Typically a search is recorded each time a search form is sent/submitted to the server.

2. Number of Menu Selections categorized as appropriate to the vendor's system. If display of data is accomplished by browsing (use of menus), this measure must be provided (e.g. an electronic journal site provides alphabetic and subject-based menu options in addition to a search form. The number of searches and the number of alphabetic and subject menu selections should be tracked).

3. Number of sessions (Logins), if relevant, must be provided as a measure of simultaneous use. It is not a substitute for either query or menu selection counts.
4. Number of turn-aways, if relevant, as a contract limit (e.g., requests exceed simultaneous user limit).

5. Number of items examined (i.e., viewed, marked or selected, downloaded, emailed, printed) to the extent these can be recorded and controlled by the server rather than the browser:
Table 10 provides an estimated compliance level for each vendor included in the comparison. Due to the lack of definitions and the exact nature of licensing and database characteristics, it is impossible at this point to complete the table. Nonetheless it shows that this group of vendors appear to provide a subset of core measures closely aligned with the ICOLC guidelines. There are several cases where vendors (e.g., Lexis-Nexis and GaleNet) expressed future plan to comply with the guidelines. The fact that a vendor has more checkmarks (✓) than other vendors should not be interpreted as an evidence that the vendor provides a superior report. There are other factors (report delivery and the level of specificity) that affect the quality of the reports.

Table 10. Estimated Vendor Compliance to the ICOLC guidelines

\ ICOLC items Vendor \	Sessions (Logins)	Queries (Searches)	Items examined	Turn-aways	Menu selections
Academic Press/IDEAL	✓		✓	n/a	
Bell & Howell/ProQuest			✓	n/a	
Ebsco	✓	✓	✓	n/a	
Elsevier/ScienceDirect		✓	✓	n/a	✓
GaleNet		✓	✓	n/a	
HighWire		✓	✓	n/a	
ISI	✓	✓		✓	
JSTOR		✓	✓	n/a	
Lexis-Nexis	✓		✓	n/a	
OCLC/ FirstSearch	✓	✓	✓	✓	
Ovid	✓	✓	✓	n/a	✓
Silver Platter	✓		✓		

✓: the measure is available.
n/a : not applicable. Some databases do not have simultaneous user limit. Hence no turn-away.
Empty cells mean either not available or there is not enough information.

One item that may need consideration for future consideration is connection time. Both Ovid and Silver Platter report this measure.

Summary of Vendor Reports Comparison

Analysis of usage statistics from 12 major database vendors reveal that there is a wide range of different practices and that progress should be made in several areas including standardization of core statistics, report delivery method, and assuring the provision of definitions of reported statistics. There are some signs in the way vendors report data that indicate some vendors are moving toward the right direction. One of the signs is the apparent willingness of many vendors to comply with the ICOLC guidelines (see Appendix D for vendor reporting capabilities). Coordination of library efforts seems necessary to bring about positive change in reporting practices and develop consistent and comparable statistics.

3. SITE VISIT REPORT

The following summary of the site visits is organized into four parts:

(1) Overview of library facts, which provides a brief introduction to the institution and a select set of library statistics;
(2) Overall approach/philosophy toward data collection and use, which highlights the atmosphere and existing strategies;
(3) Data collection activities, which deals with who is involved in the process and describes their roles; and
(4) Data use and main users, which examines the main consumers of the collected information and the documents or channels through which data are disseminated.

Virginia Tech (VPI & SU) Library

1) Overview

Virginia Polytechnic Institute and State University, popularly known as Virginia Tech, is a comprehensive university located in Blacksburg, VA with a national reputation for its premiere engineering and technology programs. It is the largest higher education institution in the state of Virginia with 25, 000 students. Key statistics about the library are summarized in Table 11.

Table 11. VT Library Statistical Summary

	1997	1998	1999
Total Expenditure (in mil.)	11.3	11.1	11.3
Materials Expenditure (in mil.)	5.7	5.4	5.5
E-Resources Expenditure (in mil)	0.5*	0.5*	0.5*
Professional Staff	37	37	36
Support Staff	97	98	98
Total Fulltime Students	23,624	24,150	24,550
Total Fulltime Graduate Students	3,673	3,702	3,686
Fulltime teaching Faculty	1,410	1,414	1,203

* : The figure does not include the VIVA consortium funding from the state.

2) Overall Approach/Philosophy Toward Data Collection and Use

Staff indicated that the main reason why the VT Library is engaged in collecting data about its collections and services is to answer the question "what is going on here?" The question, although very open-ended, demonstrates that electronic materials and services are relatively new and therefore they don't have a full understanding of how these new services are being received by users and whether the resources are returning values to the users and the library.

The other main reason why the library collects data is to use them as a vehicle to demonstrate library's accomplishments to the administration and the user community. Data are gathered with a reasonably clear understanding of how they will be utilized in various reports and other justification materials, i.e., budget requests.

Having the right data in this area has become an important issue because, like many other ARL libraries, VT Libraries is experiencing a steady decline in services such as reference, external circulation, and in-house use of materials. Knowing how users are meeting their information needs became an important area of investigation for the library. At the same time, library staff want to know the dynamics between the use of traditional print materials and materials in digital format to be able to answer questions such as "is there a trade off between use of these materials?"

The general approach at the VT Library in terms of collecting data on electronic resource use is to get just enough data that can support "best guess" decision making for service delivery. The data also helps the library document the high use of electronic resources to justify the direction that it has taken and demonstrate that with more funds it could provide more services. However, the amount of institutional resources to collect and process more detailed data is quite limited.

First and foremost, they need data collection techniques that are easy to implement and use, preferably in formats like a spreadsheet or database. They also would prefer data that can be generated in-house rather than relying on vendors. Usage statistics from database vendors tend to be slow in coming and are at best confusing with problems such as inconsistency of measures and unclear definitions.

The number of click-throughs to individual databases and full-text journals from the library's electronic database webpage is a good example of such data that can be obtained with reasonable efforts. VT Library did and still can collect information about where the users come from, through the modem pool, from somewhere else on campus, or from library machines. However, with the locations constantly changing, they are no longer analyzed.

3) Data Collection Activities

VT Library's data collection can be described as a distributed model. Three key staff members are currently involved in the process:

- Director of Collection Management and College Outreach for use data from database vendor products accessed though the VIVA (The Virtual Library of Virginia) Consortium and databases mounted locally;
- Director of Information Systems for generating measures related with library webpage access; and
- Director of the Digital Library and Archives (DLA) for use statistics related with electronic theses and dissertations database, and electronic journals hosted by VT Library.

VIVA, started in 1995, is a state-funded consortium aimed at cost effective purchase and consolidated access to a wide array of selected electronic resources. Thirty-nine state-assisted universities and colleges as well as 32 private institutions in the state of Virginia now participate in VIVA. The state funded close to 4 million dollars for VIVA related expenditures during the 1998-2000 period. The main rationale for this type of arrangement includes cost savings and making resources available to a wider pool of institutions which could not have afforded access to these materials. (VT Library's electronic materials expenditure is significantly underestimated since it does not include the VIVA funded portion.)

As far as facilitating data gathering for member libraries, VIVA provides a central webpage containing use statistics from the vendors. With a single login to the page, member libraries can access statistics, both current and past, summarized usually by month. Note that the data elements contained in the page are no different from the data supplied by the vendor to individual libraries that do not belong to the consortium.

One clear advantage of belonging to a consortium like VIVA is that libraries can save time in processing the raw report files provided by database vendors. But an even more attractive feature is that libraries can compare their own numbers with statistics for other peer member institutions. That enables VT Library to ask questions such as "Why is VT Library's use of GaleNet so low compared to U of Virginia's?" Therefore, the information provides ways of putting data into some context for rudimentary benchmarking and validating common senses.

But not all databases' usage statistics are summarized by institution in the VIVA's statistics page. In some cases, member libraries have to access the database vendor's statistics webpage directly to retrieve its own use data using a separate user id and password assigned to them by the vendor. In that case, they can not have comparison data unless the database vendor, for example JSTOR, provides such a feature.

Below is the list of vendors whose statistics are summarized on the VIVA's statistics page.

- ABC-CLIO
- Cambridge Scientific Abstracts
- Chadwyck-Healey
- Congressional Universe
- Dow Jones Interactve
- FirstSearch
- GaleNet
- InfoTrac
- HarpWeek
- Academic Press/IDEAL
- MathSciNet
- Ovid
- Oxford English Dictionary
- Periodicals Contents Index
- Project Muse
- Statistical Universe
- Stat-USA.

An institution like VT has many electronic databases that it subscribes to in addition to databases subscribed through VIVA. Collecting usage data from these databases falls to the responsibility of the Director of Collection Management and College Outreach. He uses an Excel spreadsheet to organize information such as vendor statistics webpage, user id, password, contact person that are necessary to access and process vendor statistics.

Collecting usage data from various sources such as VIVA, vendor websites, saved email messages from vendors containing reports usually takes one full day per month. He noted the difficulty in delegating the responsibility to other people. This has to do with the fact that vendor statistics change constantly. There are not yet normalized. It requires significant background information to know what's going on with the vendors and what various statistics at different times mean. He also noted that it is difficult to delegate the data collecting activity because of the necessity for someone more close to the issue on hand to review the data and spot any irregularities.

All the collected data are entered into an Excel spreadsheet, mostly on a monthly basis. In the spreadsheet, each database file's usage is represented by one (two in a few cases) measure(s) most indicative for that particular database. While for most database products, it is either number of searches (or queries) or number of sessions (or logins), other units such as item views, hits and connection hours are being summarized as well. The compiled data, though with some gaps, provide the usage trend over time.

VT Library has a unit called Digital Library and Archives (DLA) that has the following three major electronic information sources:

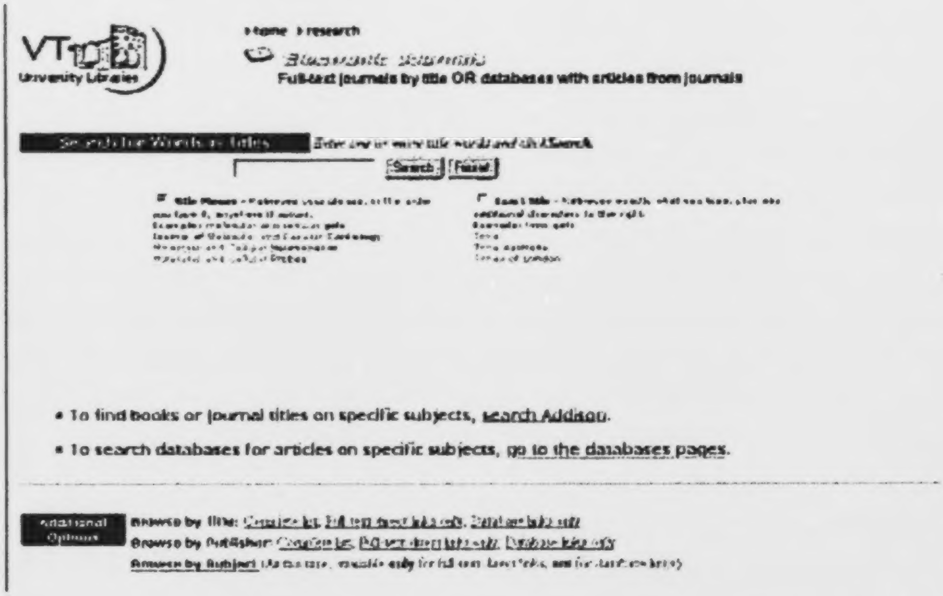
- VT theses and dissertations (2,356 items as of 6/30/2000);
- Electronic full-text journals mounted on and accessed through VT (21 journals as of 6/30/2000); and
- VT Imagebase.

Usage statistics such as page requests, for these groups of collections are being captured by a web access log software called *analog v4.11* on a monthly basis. For full-text journals, page request information by journal is available. A summary report (98/99 and 99/00) is available on the homepage of DLA (http://scholar.lib.vt.edu). The log analysis part of the report is essentially automated. Once the data are available, they are then keyed into an Excel file to generate various graphs showing monthly and yearly trends.

4) Data Use and Main Users

In regard to licensed materials included in the VIVA package, there is a selection committee that carefully monitors all renewals. Materials specific to VT are also monitored monthly by the Director of Collection Development and the University Librarian.

Figure 1. VT Library Electronic Journals Webpage.



Full-text journals by title OR databases with articles from journals

- To find books or journal titles on specific subjects, search Addison.
- To search databases for articles on specific subjects, go to the databases pages.

Data on database usage is scrutinized for contract renewal/cancellation. Cancellation of a database occurs only after a well-publicized and intensely studied process.

The data are being used to improve service advertising or delivery. A specific example is that the VT Library keep monitoring data that captures what users do in the library's electronic journals page as shown in Figure 1.

One of the things library staff discovered from the data is that many users confuse the search box for the online journals as an Internet search engine or a search box for the library online catalog (OPAC). There have been several attempts to fix the problem. One of the solutions was to place a separate link to the OPAC in the same page so that people know they have to click on that link to go to a page where they can search the OPAC. The finding also helped the staff involved in user education to emphasize the differences among various search aids or tools.

A primary medium used for communication with the university administration is the annual report. In the report, the overall extent of electronic resources and overall summary of the extent of their use are featured prominently. The choice of data to be included in the report and the narratives that go along with the data are crafted by the University Librarian with consultation from directors involved in the particular data elements. The following table summarizes the kinds of information included in the annual report during the last three years.

Table 12. Data Related with Electronic Resources Appear in VT Library Annual Reports.

1997/98	1998/99	1999/00
Top ten databases	Top ten databases (with # of searches)	Top ten databases (with # of searches)
No. of electronic (reference) questions	Articles delivered through online databases	Full text articles delivered from major vendors
	Accesses to Digital Library and Archives Resources	# of electronic reference service
	# of online databases	Library web hits
	# electronic journals	# of full-text electronic journals

Table 12 shows that over the years the number of reported measures is increasing. While in 97/98 only the list of top 10 databases are mentioned, in 98/99 and 99/00 the list also provides the number of searches conducted by users. The number of documents delivered is also featured in the report as an indication of more refined measure of user benefits.

Sometimes the information is presented with an annotation that gives a hint of how VT Library is fulfilling user demands. For example, referring to the inclusion of the Web of Science from ISI (Institute of Scientific Information) in the top ten database list, the 98/99 report notes, that the library:

> Procured a five-year backset of the Web of Science, allowing Virginia Tech faculty and researchers to follow the flow of ideas and influence among scholarly papers via citation-based relationship and noted 17,000 uses of this new service.

5) Summary

VT Library's measurement efforts in describing networked resources can be summarized as "opportunistic" or on an as needed basis. Data collection activities appear to be closely related with decision-making. The library director is actively engaged in the evaluation and reporting process. Also it appears that collected data are being used in library reporting documents. The fact that the library has a highly visible local digital collection, electronic theses and dissertations, gives an impression within and outside the university community that it is an effective player in the electronic environment. The consortium's role as a facilitator of data collection was visible and enhances the electronic presence.

University of Pennsylvania Library

1) Overview

University of Pennsylvania is an urban IVY league school located in West Philadelphia and it is known for strong programs in such fields as business, medicine, and communication. Key statistics about the library are summarized in Table 13.

Table 13. U. Penn's Library Facts

	1997	1998	1999
Total Expenditure (in mil.)	26.3	28.8	29.7
Materials Expenditure (in mil.)	8.5	9.2	9.7
% of Electronic Resource	7.6	13.4	13.2
Professional Staff	110	112	117
Support Staff	178	173	178
Total Students	17,595	17,595	17,743
Graduate Students	8,111	8,111	8,177
Faculty	2,060	2,110	2,165

2) Overall Approach/Philosophy Toward Data Collection and Use

One thing that may distinguish U. Penn library from many other ARL libraries is that the bulk of library costs (85% during 98/99 year) are charged back to 12 schools within the university system. Started in the 1970s, the allocated costs system places the library under constant pressure to justify its expenditure and its cost effectiveness to the university community. Currently the costs are allocated to schools based on the number of faculty in each school and the number of course units offered by each school.

Perhaps the most revealing fact attesting to the library's reporting obligation to the university administration is the following memo from the Council of Deans to the Director of Libraries. Here the deans request quantitative information about the use of library resources and patterns of information need among students and faculty.[1]

1. Who uses the library, i.e.--breakdown by school; status (student/standing faculty/research faculty/adjuncts/staff/full vs. part-time).
2. What types of uses--books, journals, reference, data, study space, etc.
3. Intensity of use--time and volume measures for both onsite and remote uses.
4. Relationships among the above--type of user by type of use by intensity, etc.
5. Patterns in the above over time.
6. Comparisons to peer institutions re the above.

---

[1] The study team asked the project participants whether they have received similar questions. Out of 16 libraries responded, only 3 said they received a smaller set of questions, primarily about comparisons to peer institutions.

7. Patterns/trends in intellectual areas of interest to users.
8. Patterns/trends in information resource use beyond the library--where do Penn people go for what types of information and how.
9. How other universities develop library budgets and apportion costs among components.

Some data produced by the library in response to the query are available in Appendix E.

Another gauge of the importance of assessment for Penn is found in the library's current strategic plan which includes this goal regarding measurement: "Develop new ways of conceptualizing and measuring library effectiveness based on outputs and measures of excellence to promote within the Library growing accountability and responsiveness to changing information environments and to track progress toward our goals." At both the strategic and operational levels, Penn's Vice Provost and Director of Libraries encourages a culture that relies on empirical data for decision-making and to demonstrate accountability. While we did not find a specific managerial structure dedicated to assessment, we did observe a high awareness of its importance among the range of staff--from the library director to programmers--who participated in the site visit discussions.

U. Penn's gives a good deal of thought and attention to the presentation of data and information about its libraries. Many official library publications, print or on-line, are of high quality. Two examples are worth mentioning in this regard. One is called the Penn Library Resource.Guide, an annual compendium of information and human resources available to the users (html version is located at http://www.library.upenn.edu/services/publications/library/guide01.pdf).The other one is a short brochure called Penn Library Facts (annual publication) that contains summary of many statistics regarding library collection, services and finance (http://www.library.upenn.edu/services/publications/library/facts00.pdf).

3) Data Collection Activities

At Penn, the library takes a team approach to data collection and analysis. The following staff are key:

- The Executive Assistant to the Vice Provost and Director of Libraries is responsible for the discovery, integration, processing, and analysis of data on library use, operations and services. He works closely with senior administration and line staff to identify data sources and statistical needs. He does not own the majority of data collection processes, but functions instead as a liaison between important consumers of data within administration and the functional units responsible for library services and programs. He is also responsible for the design and publication of quantitative information for the system.

- Library Systems Office manages data logs generated by the OPAC and other web servers, and provides software programming to extract data for analysis

- The Library Web Manager is responsible for many of the infrastructural features of the Library web that provide information about use. A good example is the creation of a click-through scheme that is used to measure database log-ons. (See more on this below.) He also has responsibility for configuring and managing log analyzer software.

- The Director of Lippincott Library of the Wharton School provides statistical expertise and analysis performed in SAS and other statistical software applications. He is a highly experienced internal consultant to the overall data analysis effort.

- The Electronic Acquisitions Librarian, functions as a main contact with database vendors and supplies usage reports to the executive assistant.

- Library Assessment Intern: A graduate internship that helps with the organization and management of log files, automated routines for normalizing streams of log data, and analysis of log output. A graduate student in the department of Computer and Information Science in Penn's School of Engineering currently holds this position.

One of the most prominent features of electronic resource use at U Penn is what it calls the attempted log-ons to various licensed materials. The information is captured by a program counting the click-throughs on the library webpage developed by the library Web Manager.

The attempted log-ons are broken down into IP (Internet Protocol) address domains that belong to schools as well as the library and modem pool domains (see tables in Appendix E). The result is an approximate picture of where the requests to licensed databases are made. Of course, these are "attempted" log-ons.

The measure "attempted log-on" has a few advantages: it is available locally and thus gives the library some independence from database vendors. However, the information it provides is spare. While it offers some degree of demographic information and allows chronological analysis of use, it still only represents the number of requests for a database, in essence the number of times a link is clicked. It will not tell if a request resulted in a session with the database, or how the database was used during a session.

Like other libraries, U. Penn Library keeps track of data provided by database vendors. Since the creation of an Electronic Acquisitions Librarian position, Penn has improved the management of licensing agreements and streamlined data collection from those vendors who provide use reports. While this organizational change has helped with the harvesting of use information, the Electronic Acquisitions Librarian continues to be dismayed by the absence of use reporting in contract agreements and the failure of vendors to supply ICOLC recommended data elements or even more modest use indicators.

U. Penn Library developed a matrix that clearly shows which vendors are providing and which are not, the types of measures reported by the vendors (searches, connection time, log-ons, documents viewed, hits/pages, and bytes sent). (See Appendix E for the matrix) The Electronic Acquisitions Librarian is responsible for collecting usage statistics from vendors and passing the information to the executive assistant. In the 98/99 period, U Penn Library reports the number of searches (either searches or log-ons from the vendor statistics) for 70 of 122 databases.

U Penn Library also maintains information about the number of "accesses" to the library web pages. It indicates that the number of accesses reported excludes button, icons, banners and other items incidental files.

U Penn Library has resources other ARL libraries may not have. For example, it has a human resource pool that contributes to data collection and analysis. In addition to systems programmers, it gets help from the director of Lippincott library, the business library for the

Wharton School. As mentioned above, this person provides knowledge of SAS , a sophisticated statistical analysis program. He also acts as a catalyst of ideas that can give new angles to the collected data and presentation. For example, he brought to the meeting a three-dimensional factor loading graph, which shows the relative distances among Penn schools, represented by the types electronic databases used by users of respective schools. This particular analysis was based on data harvested from attempted-logons. Penn's School of Applied Engineering and Science is also proving to be a good source for highly skilled students who can supplement the efforts of full time staff in the development of measurement strategies.

Penn staff cited the following as having significant impact on their efforts to measure use of e-resources:

- the lack of common metrics across database products and systems,
- the absence of use measures for many products,
- the great time required to chase down and process third party data reports, and
- the lack of a standard, uniform means of data transmission. Here the Penn staff was particularly insistent about vendors providing a steady stream of raw or semi-processed use data from logs which libraries could access and analyze according to their local needs and desires.

Overall, U Penn Library's data analysis capability is considered exceptional compared to other libraries. Also there is an attitude of "are there any other ways to collect and look at the data?" that has been cultivated in the library. In addition to asking what are the measures that can provide quick answers about electronic materials usage, people seem to be quite interested in spending extra effort to produce quality data.

The case in point is analysis of data provided in the proxy server log. Proxy servers allow users who connect to the licensed materials through various ISPs (internet service providers) a legitimate way to use them. With the introduction of a proxy server, it is possible to capture every movement a user makes in a browser (including keystrokes and clicks) after the point when he or she is validated. While it is an enormously useful data source not only about use statistics but also about user behaviors which otherwise can not be captured, it presents a considerable burden to a library to sift through the log files, which can be quite large. Currently U Penn Library is in the process of developing software programming and an analysis infrastructure to tap into that data source.

4) Data Use and Main Users

Usage information of electronic materials is being used for budget planning and justification. Information is provided to the university administration in the forms of tables and graphs that are designed to convey the message that expenditures are indeed well spent. There was a sense that presentation of various statistics is being received well within university administration.

As Penn devotes larger sums to the acquisition of digital information, it is careful to maintain historical levels of print acquisition. The library's goal is find and keep a proper balance among formats. Thanks to steady increases in its endowment for information, the library has been able to sustain higher levels of expenditure for networked resources without detriment to its print collections.

Information about the size of electronic collection and use from the collection are featured prominently in the Library Facts documents. For instance, under the Digital Library heading, the following are key items reported in the 99/00 document:

- Number of library web pages accessed (96/97 to 99/00);
- Number of searches in the OPACs and licensed databases (96/97 to 99/00);
- Number of journal article indexes and full-text files (96/97 to 99/00);
- Number of electronic journals;
- Number of records in locally mounted databases; and
- Number of locally digitized and accessible images.

The pamphlet also reports the portion of electronic information purchase out of total materials expenditure.

In terms of specific journal renewal and cancellation situations, usage information is reviewed by the selectors and the Electronic Acquisitions Librarian. However, low usage does not always lead to cancellation. There are other factors, political and pragmatic, that must be considered in making those decisions.

Web statistics inform the Web Manager and other systems specialists to look at better webpage designs that promote easy access to the pages. One of the things that the library does is to have an area in the library homepage that is devoted to the updates on new electronic resources. The number of access to the links provides some indication of user interests to those materials.

5) Summary

Overall, U Penn library is a leader in data collection/analysis and delivering measures of electronic resources and services. This may be attributed to its unique environment in terms of its funding structure, the library director's leadership in the area of assessment, and a unique pool of human resources dedicated to the process. Having a fulltime staff member who acts as a data advocate in the library is also an important factor.

Other research libraries can benefit by examining U Penn Library's reports included in this document and available on its website. However, the library's strength seems to be embedded in the organization's focus on evaluation-based planning and execution, encouraging a culture of evaluation, and committing resources to produce various analyses and reports.

Yale University Library

1) Overview

Founded in 1701, Yale University is a premiere Ivy League institution located in New Haven, CT. In addition to its strong undergraduate programs (Yale College), the university has many world-renowned professional programs in such areas as law, medicine, theology, business and architecture. Key statistics about the library are summarized in Table 14.

Table 14. Yale Library Facts

	1997	1998	1999
Total Expenditure (in mil.)	39.2	42.1	42.8
Materials Expenditure (in mil.)	14.8	16.4	17.7
Electronic Resources Expenditure (in mil.)	0.9	0.9	1.0
Professional Staff	201	212	217
Support Staff	311	316	345
Total Students	10,763	10,663	10,832
Graduate Students	5,451	5,348	5,451
Faculty	1,792	1,792	1,825

2) Overall Approach/Philosophy Toward Data Collection and Use

Yale Library's approach to collecting and using data needs to be understood in the context that it is extremely committed to and also capable of purchasing high quality information resources in a wide range of areas to its users. Individual subject specialists make purchasing decisions on both print and electronic resources in their given fields of interests. There are currently about 50 subject specialists in the library. Purchasing of significant resources spanning multiple disciplines (for electronic materials) is coordinated by the Electronic Publishing and Collections Specialist. Data are sought to assist decision making for the selectors, Associate University Library for Collection Development, instructional librarians and the Electronic Collections team.

3) Data Collection Activities

The Electronic Publishing and Collections Specialist is in charge of collecting raw data from vendors and selectors and making them available to internal staff members that include subject specialists and Associate University Librarian for Collection Development. The responsibility for data collection from vendors is gradually moving to the Digital Collections Specialist who reports to the Electronic Publishing and Collections Specialist.

Information is collected from password protected vendor statistics websites, email attachments from the vendors, and print reports. The Electronic Publishing and Collections Specialist has an assistant working for her to enter raw data from various formats to html format. The html files are centrally managed in the staff web area (see Appendix F for the image of the first screen) where links are provided to not only the current statistics but also past statistics. Some of the data goes back to 1992 (for Lexis-Nexis telnet product). There is also a link to usage statistics for retired electronic resources.

According to the assistant, it takes about 3 hours a week to enter data into intermediary spreadsheet (Excel) PDF files and to update the statistics page. For each available vendor statistics report, there is a brief paragraph explaining the format of the provided statistics, frequency of report, and any substantive changes in the statistics. Many statistics are accompanied by Excel-generated graphs showing usage trends. In addition to the 3 hours a week invested by the assistant, the Electronic Publishing and Collections Specialist estimates that she spends about 2 hours per week on average retrieving and refining statistics. In addition, she spends a minimal amount of time contacting vendors to provide data.

Another major information gathering activity at Yale library takes place at its medical library. There, the Informatics Librarian is a central contact person for statistics on electronic materials.

At the medical library, many full-text journals are locally mounted through OVID (a database aggregator) interface as well as a number of databases. Statistics are gathered on the number of sessions to each database in the OVID offering. Mode of access (Web, telnet or Z39.50) is also captured and it shows, not surprisingly, that many people switched from character-based telnet access to the resources to the Web interface.

Other kinds of information collected at the medical library include number of electronic books consulted, number of electronic reference queries, webpage access, and vendor supplied usage statistics. Staff expressed some concern that while a large amount of information is being collected, the library may need to take additional steps to use it effectively in decision making.

4) Data Use and Main Users

Since so much effort has gone into acquiring statistics from the vendors and converting them to uniformly accessible forms, the data are taken quite seriously. Usage statistics are a strong element in the review of cost effectiveness of purchased databases. However, usage is not currently the only factor in electronic resource subscription cancellations: usage statistics are weighed with and against other factors as well. Usage statistics are passed along to the subject specialist. Staff indicated that Yale library, as many other research libraries, is having problems with vendors who do not provide any statistics at all. In that case, it is difficult to understand use and take appropriate actions to improve service.

One of the specific areas where data are used very effectively is deciding the number of simultaneous users that are licensed for access to a given database, where simultaneous user (S/U) is the payment model. Turn-away figures from vendor usage statistics are closely examined and related to the number of user complaints.

Statistical usage data are distributed, for the most part, internally. For the last several years, the first issue of Nota Bene, a library newsletter published three times a year, contained an annual report from the university librarian. It is a narrative summary of major library events and accomplishments and not intended as a full report containing detailed information about the use of library collections and services including electronic materials. In the spring 1999 issue, however, there was a report by the Electronic Publishing and Collections Specialist about the increase of electronic resource use with JSTOR and Eureka as examples (http://www.library.yale.edu/NotaBene/nbxiii2/arcxiii2.htm). In the medical library, most of statistics that are mentioned as collected are reported in the library's annual report.

5) Summary

Among many of its strengths in the area of collection of data regarding electronic resources two points are worth mentioning. The first one is that there is a staff member who maintains an on-going, clear communication with database vendors. This has not only benefited Yale Library but also other research libraries in some instances. The second strength is their information organization skill which transforms a range of data into separate information products available to involved parties for reference and decision making.

The New York Public Library, the Research Libraries

1) Overview

The New York Public Library is the only facility of its kind, with both world-acclaimed research centers and a large network of neighborhood branch libraries, all of which may be used by the public, free of charge. The Research Libraries consist of four centers: the New York Public Library for the Performing Arts; the Schomburg Center for Research in Black Culture; the Humanities and Social Sciences Library; and the Science, Industry and Business Library. Among these, the Humanities and Social Sciences Library (HSSL); and the Science, Industry and Business Library (SIBL) are the principal users of electronic information. Key statistics about the library are summarized in Table 15.

Table 15. NYPL (The Research Libraries) Facts

	1997	1998	1999
Total Expenditure (in mil.)	43.0	43.7	44.8
Materials Expenditure (in mil.)	9.5	10.4	11.0
E-Resources expenditure (in mil)	0.9	1.2	1.3
Professional Staff	253	259	n/a
Support Staff	373	368	n/a

n/a : not available

2) Overall Approach/Philosophy Toward Data Collection and Use

One important fact that distinguishes NYPL as a research library from other ARL libraries is that it does not have a captive pool of users. While the potential service pool is almost limitless, it also makes it difficult for the staff to develop focused service programs for clients.

As far as the electronic collection is concerned, access to most licensed databases is provided on-site. There are about a dozen licensed databases that are available to registered users for home use through shared subscription with branch libraries (85 branches as of 8/30/00). However, these databases are geared toward general public use rather than for research purposes.

Since NYPL receives part of its funding from the city and state governments, there is a specific reporting requirement in regard to these expenditures. For example, the state government requires that the library report the number of electronic database subscriptions and the overall cost. More detailed requirements do not appear to have occurred as yet.

3) Data Collection Activities

Vendor statistics for licensed materials are gathered by the Research Library's Chief Librarian for Acquisitions, whose division is responsible for the materials acquired for all four Research Libraries. Data also flows from electronic resources specialists in the various units of the Research Libraries to the Chief Librarian. There is an Electronic Resources Group (ERG) that reviews purchasing requests from selectors and coordinates purchasing decisions among Research Libraries. Purchasing is centralized across the Research Libraries.

Every month, vendor supplied use statistics are entered into a monthly statistical usage report by each database in the licensed package. The most representative measure of use statistics is assigned to the database to calculate the unit cost per each use instance. For many databases, the vendor-supplied statistic is number of searches. Number of records accessed, items viewed, and number of requests are examples of additional metrics used. There is no information about what these measures mean as they are taken directly from vendor reports and the vendors do not provide definitions in the reports.

4) Data Use and Main Users

Database use is scrutinized for being cost-effective. The main objective is to spot low-use databases and consider decisions regarding product placement and promotion of electronic resources. Some of the ways to promote a particular database or resource is to feature it on the web site or in public training classes.

SBIL (the Science, Industry and Business Library) offers free user instruction courses on a wide range of topics and interests. These sessions feature a variety of electronic resources. SIBL averages about 900 training class participants per month. Other Research Libraries will be developing structured training programs for users in the coming months.

Monthly database use statistics, containing available use counts for each vendor along with annual cost and per use cost, are circulated among ERG members and shared within their own units. A member of the ERG is the Deputy Director and through that person, a summarized version of the statistics is reported to the Research Libraries Management Team headed by the Director of the Research Libraries.

As far as an official channel of information dissemination regarding these data, the closest thing appears to be the annual report. The report describes the overall activity and summary facts (e.g., major contribution and financial statements) of the NYPL and is not limited to the Research Libraries. In the annual report (http://www.nypl.org/admin/pro/ar/annualrpt.html), the following four items are summarized under the cyberfacts heading in Facts & Figures section:

- Electronic visits to NYPL website annually;
- Countries accessing website;
- Computers for public use; and
- Electronic databases for public use.
-

These numbers are for the entire NYPL, including both the Branch Libraries and the Research Libraries.

5) Summary

The most noticeable factor at NYPL is its ability to relate the collected data on electronic resources to its instructional programs. User education is a big topic with which many research libraries are concerned, and NYPL's expertise in offering high quality programs can benefit other research libraries. A second factor to stress is NYPL's on-going cost/benefit analysis of its electronic resources. The decision process for this analysis may be of interest to other libraries.

Summary of Observations

Libraries are under different operating environments and have different needs in terms of data for electronic resources. The environment and attitudes towards assessment are being shaped by the institution's involvement with the library operation and the library's top management attitude toward evaluation efforts. Support for the institution's involvement can be manifested in various forms such as library funding structure, provision of staff, and use of various data to support decision-making.

Libraries are having a serious problem managing information on the use of electronic resources and services, particularly with regard to licensed vendor materials. Information sources often reside under vendor control. Although most information delivery is carried out on via the Web, users have to go through different interfaces for different types of resources. Accordingly, usage statistics are distributed among typically several dozen database vendors and consortia. Due to a lack of standardized reporting practices, usage reports are hard to consolidate, or it takes an enormous amount of effort to collect such data. Communication between database providers and the research library community is sorely needed to address the problem.

While libraries are making progress in many areas of measurement of electronic resources, libraries have yet to succeed in producing a coherent picture about the utilization of electronic information. While there certainly are a range of issues that have yet to be addressed here, some steps can be taken now by ARL libraries. We will discuss preliminary suggestions that can help research libraries move in that direction in the next chapter.

PART FOUR: ISSUES, SHORT-TERM RECOMMENDATIONS, AND NEXT STEPS

A key question addressed by this study is: how can ARL libraries become more successful in describing networked information resources and services at their libraries? As the Phase I report indicates, it is difficult to delineate specific factors leading to success as yet – indeed, it may be too early to offer "best practices" given the state of knowledge in this area.

To a large degree ARL libraries have just begun looking at this topic seriously and formal assessment activities in this area differ among ARL libraries. Clearly, there are a number of libraries that are working in this area and gaining experience with some specific procedures such as cost analysis and collection development. But as a group, it is difficult to point to specific best practices among participating libraries and offer a coherent picture of issues, strategies, and specific techniques related to producing statistics and performance measures to describe networked services.

1. Selected Issues

The findings from Phase I (see previous chapter) suggest that there are a number of key issues that could benefit from additional discussion and research. This section briefly identifies and describes some of these issues.

The Complexity of This Topic

As the study team and the participating libraries continue through this project, it appears that the issues and possible approaches for developing statistics and measures for the networked environment may be more, rather than less, complicated than anticipated originally. Moreover, the degree of this complexity is only beginning to be understood.

One project participant scolded a member of the study team: why haven't we already produced draft performance measures that all ARL libraries could use to describe journal use from vendor-supplied databases. When the study team member explained that there were still a number of issues and problems necessary to address before it is possible to develop such measures, the participant replied, "I don't care about the problems, just give me the measure." Thus, it is necessary to better understand the range of the complexities affecting the development of statistics and performance measures by *both* the library and the vendor community.

Given the complexity of the topic, there is a need to better educate participating libraries, university administrators, vendors, and others as to the nature of these complexities and how they affect developing statistics and performance measures. These complexities include factors related to both data collection and analysis as well as organizational/institutional factors.

Diverse Context for Developing Statistics and Performance Measures

There are a range of unique and situational factors at the various participating libraries that affect the:

(1) Library's need for statistics and performance measures;
(2) Degree to which the library is willing to commit resources to produce such statistics and performance measures;

(3) Range and type of databases being used by the library;
(4) Library's staff relationships with the vendors of these databases; and,
(5) Specific type of statistics and performance measures that would be useful in a particular library setting.

In some libraries, there is less interest from university administration as to the benefit, impact, and use of electronic resources with resulting "less pressure" to produce descriptive data. Other libraries have significant cost and administrative pressure to produce such data. Thus, the nature of the university context in which a library operates has a significant impact on the development of statistics and performance measures to describe their networked services and resources.

This diverse context suggests that while there may be a set of "core" statistics and performance measures that would be of use to all libraries, there is also likely to be unique statistics and measures that will be of greater interest to some rather than others. A better understanding of local factors that affect the need for specific types of statistics and performance measures will require additional attention. Models that can help describe these local situations may also be useful in the selection of statistics and performance measures.

ARL Library Responsibilities and Level of Effort

The results from Phase I suggest a wide range of self-induced responsibilities and level of effort on the part of ARL libraries for data collection, analysis, and reporting. In the Scottsdale meeting, more than half of participants indicated that they had no data collection activities in the area of electronic services and resources, while others reported some considerable effort.

To some degree, the amount of responsibility and level of effort that the library will commit to data collection and analysis of networked services and resources depends on their context, the perceived importance of having such data, and how such data might be used effectively in the local setting. Yet to be understood is what constitutes "reasonable" levels of effort on the part of the library to collect and produce such data *at a given library or at libraries in general*. Some libraries may need only to commit minimal resources to obtain the data that they need, whereas others may have to commit significant resources in order to obtain the data required for their decision making processes. Again, models that describe and relate local level of efforts to uses and applications of statistics and performance measures may be useful.

Focus on Non-Vendor-Based Data

Phase I of the study suggests that a number of libraries are not well prepared to collect, analyze, and report data related to networked services and resources – regardless of whether the data comes from vendors or from internal library activities. Further, there are a number of data elements related to networked and electronic services that are not dependent on data being supplied by vendors. For example, statistics related to counting and describing users of electronic reference (web-based or email based) are not dependent on obtaining data from vendors. Yet, there is some sense to focus on the vendor-based statistics rather than other types of networked and electronic statistics.

While the database statistics supplied by vendors are essential, there may be other types of electronic data that libraries might try to collect and analyze. As suggested in the findings section of the study and in selected appendices, there are statistics and measures being collected that describe activities other than database use, users, and uses. In the short term, libraries may want to continue their efforts in these areas until there is some more general agreement with vendors on obtaining and using statistics from those vendors.

Coordination Among Libraries and Library Organizations

In previous work conducted by the authors, a number of vendors noted that different libraries, different library professional organizations, and different national organizations have different needs and agenda regarding the development of statistics and performance measures to describe networked services and resources. Minimally, there are the following players in this discussion:

- Individual libraries (of all types). Particular libraries may have specific needs for collecting data, analyzing data, and the manner in which data are reported to them, thus, they contact the vendors directly to express their needs.
- Professional associations. Various groups in the professional associations regularly meet to discuss data needs from vendors and how best to obtain that data.
- National Commission on Libraries and Information Science (NCLIS). The Commission is currently engaged in a project to facilitate public librarians, state libraries, and selected consortia to work with vendors to describe the types of data that should be made available and how it should be reported to libraries.
- Funded Research Projects. Currently the authors are funded by a group of 24 ARL libraries to work with vendors to develop statistics and performance measures (among other objectives). The authors are also funded by a grant from the U.S. Institute of Museum and Library Services (IMLS) to develop national models and techniques for standardized data collection of networked information services and resources for public libraries. There are likely to be other such funded research projects.
- ICOLC. This group has met for a number of years and currently has guidelines regarding the definitions and data collection strategies for databases (see Appendix C).
- Council on Library and Information Resources (CLIR). This organization has contracted with Judy Luther to write a white paper on the E-Journal Usage Statistics <http://www.clir.org/pubs/reports/pub94/contents.html. CLIR can be expected to continue its work in this area.
- National Information Standards Organization (NISO). The international standard for library statistics is currently under review and NISO is leading a process in the United States to develop revised standards for library statistics including database related statistics.

There may be other key groups currently involved in developing database statistics and performance measures. Nonetheless, it is imperative that the efforts described here are coordinated such that vendors are not besieged by multiple individuals/organizations with multiple (and possibly confounding) objectives.

Summary

This section is not intended to be a comprehensive listing of issues that the study team identified as part of Phase I. These issues do, however, suggest that there is a wide range of opinions and approaches regarding the topic with relatively little agreement as to specific strategies (both at individual libraries and among various organizations) that might be best pursued while the project continues.

2. Short-term Recommendations

This section offers specific strategies and suggestions that may be useful for participating libraries to consider as the project continues. We expect these suggestions will become more formalized as the study continues and as we witness improvements in library practices. Some of our suggestions address issues that may not seem directly related with measuring electronic services and resources. For example, measurement of library and user activities related to electronic information services and resources should not be viewed in and of itself. Rather the process has to be incorporated into the overall library assessment effort. We believe that the research library community already recognizes this issue and is working toward a more holistic approach to evaluation.

As previously noted, we recognize that libraries operate in different contexts. We also recognize that libraries have different needs to fulfill and varying amounts of resources to tap. Nonetheless, we believe that these short-term recommendations and suggestions will be useful regardless of the specific types of statistics and performance measures that ultimately are recommended by the study.

Libraries Should Cultivate a Culture of Assessment

There has been some work done on "culture of assessment." Amos Lakos (1999, p. 5) defines culture of assessment in libraries as:

> The attitudinal and institutional changes that have to occur in order for library staff to be able to work in an environment where decisions are based on facts, research and analysis, and services are planned and delivered in order to maximize positive outcomes and impacts for the library clients. Culture of assessment is an integral part of the progress of change and the creation of a customer-centered culture.

Such a culture is essential if the library is to move successfully into assessment of networked information services and resources.

Assessment of library performance of networked information resources cannot be separated from the overall assessment of the library's roles and the extent of fulfillment of those to the user community. It is a very encouraging sign that many libraries expressed a desire to investigate not only their performance using electronic resources but also how such performance is related to the overall library mission. One library director during the site visit commented, "Everything is related. So we need to concentrate on non-electronic information too. E-data isn't important just by itself. It is part of a total picture that is being examined."

Library directors and other staff will need to foster recognition of the importance of assessment in his/her library. Although this issue has been discussed for several decades in the library community, we repeat it here again: unplanned, unsystematic approaches to evaluation will satisfy only short-term needs. A culture of assessment requires making assessment a library priority as well as careful planning. If a library is considered performing well, it has to be demonstrated by supporting data. In some cases, trust among the user community and the institution can be regarded as a sign of library success, not as an excuse for not engaging in active assessment activities. Even then, the library can perform better if it operates on the premise that assessment can drive better performance.

Libraries Need to Plan and Implement Organizational Structures That Support a Changing Statistical Environment.

Rapid penetration of electronic materials and services into the research community and changing user demands of information prompt research libraries to reconsider their current organizational structure to assist in collecting data for performance measurement. The size and specific forms of needed organizational structure depend on the library's needs and resources. However, there are several guidelines to consider.

One of the key issues regarding organizational structure is that it is critical to have a library office specifically involved and responsible for evaluation and assessment. This is a difficult issue for some libraries because of a shortage of library technical staff. In some libraries, a library system's resource pool is stretched simply to keep up with the day-to-day operations. Nonetheless, the systems (or other) department needs to run programs or even write special programs to capture or process data to produce a range of statistics and measures. Reliable and high quality data cannot be obtained unless data needs are identified in advance and integrated into the organizational information systems large and small. While off-the-shelf software solutions are essential and have their place, libraries may need to develop their own data gathering and analysis infrastructure to suit their special needs.

The study team conducted a quick poll to describe the organizational structure that the project participants currently have to coordinate the collection and analysis of data on electronic resource use. Fourteen libraries responded to the question. Among them, only six libraries said someone in the systems or a technical department is represented in the data collection and analysis process. The responses from the fourteen libraries are summarized in Appendix G.

Also apparent in the responses was an apparent lack of ownership in the process, in the reported organizational structures, and the limited scope of the structures' roles. Too often, these groups deal with only one aspect of data collection, e.g., licensed materials, and it is not clear who is responsible for data analysis and presentation in other areas. It may be too limiting to have the committee or team simply collect raw information and pass among the group and to other parties in the library. More useful is a team or specific individual being charged with the whole data collection/analysis/reporting process throughout the collection, processing, analysis and presentation of evaluation information.

A number of participants reported that the organizational structures for assessment were designed to facilitate purchasing of electronic resources. However, the scope of those groups may well need to be expanded to cover other important issues such as changing user behaviors, education of library staff and faculty, and considering demands and the dynamics between print and electronic materials. Again, we notice that several libraries are already moving in this direction.

Libraries Should Have Clear Statements about Their Assessment Goals in Key Documents Such as Strategic Planning.

Some libraries are not clear about why they are engaged in the measurement activity. Many were able to articulate the immediate needs such as to make purchase decisions and to justify budget decisions. But some library organizations seem to have difficulty in being able to link the measurement effort to the overall goals of the library and the larger institution.

Strategic planning is a useful tool to answer questions such as "what are the objectives of data collection and analysis?" By describing specific measurement efforts for each of the library's goals and implementation plan, libraries can relate specific data collection and analysis activities to the overall goal of the library.

Another important aspect of strategic planning is including measurement activity itself as a major goal or priority. The University of Pennsylvania Library, for example, promulgates developing new ways of measuring library effectiveness as a key goal in its 1996-2000 strategic planning. Only a few other participating libraries mentioned assessment and data collection related to networked services in their strategic plan.

It is important that measurement areas and goals are clearly identified in the strategic planning document. Otherwise, it is likely that they may be ignored. Having a well-planned initiative in a specific area with measurement goals and objectives will facilitate the planning process. By doing so, processes and experiences gained can be used in other areas of library measurement.

Importance of a Data Advocate

Having an official data advocate in the library to measure both traditional and electronic information resources and services can enhance the success of measurement efforts. At most ARL libraries, there is a staff member who has responsibility for collecting statistics for internal use and for outside organizations, most often ARL statistics. This person may also be able to serve as a data advocate within the library.

Given the complexity of measurement and evaluation in today's library, eventually the role or position may need to become a full-time position or positions depending on the library's resources and expectations. The person works closely with library management in terms of information needs for various purposes. The official title can vary. But it is important that the person becomes visible in the library and be deeply involved in the entire process of data collection, analysis, and presentation. An ideal situation may be one where the data advocate coordinates the organization's overall assessment activities including fulfilling outside reporting requirements and working directly with vendors.

This kind of position can assist libraries to coordinate data and assessment into the overall organization's activities not only to meet the needs of specific functions or departments but to meet external requirements as well. Also since most data are funneled through this person, there may be increased reliability and validity of the data for both the data and the measures. This person can function as a resource to the library's measurement initiatives. The desired skill sets for data advocate include excellent communication skills, an ability to educate staff and faculty as to the importance of such data, as well as data analysis, and presentation skills.

Develop Action-Oriented and Problem-Oriented Data Gathering

Data should not be collected simply because they are available. A key criterion for what data to collect is the degree to which that data address specific problems, adds information to decision-making, or otherwise improves library services. For example, some libraries employ *WebTracker* or *WebTrends* to produce a range of log analyses. But if the programs are run without first thinking about what data are necessary for what problems and decision situations, it is likely that the data will remain in the various reports generated by the software. A number of library staff commented that such software was in use at their library but that the resultant reports were largely ignored.

A good approach is to have clear objectives of why the library needs certain data and what problems or decision situations should be addressed by the data. A limited amount of data gathered with clear intentions is much more valuable than a vast amount of data with no specific purpose.

It is not likely that we will ever have satisfactory data for all of our electronic resources. The skill libraries have to develop is to act and make decisions based on "good enough" data. We should look for data that can support "best assessment" decision-making. What is important is that decisions are made and actions are taken based on data or its analysis. Most frequently, data about electronic resource usage are used primarily for assessing contracts. But the same data can be effectively used in reporting to and communicating with the user community and supporting organizations. Perhaps most importantly, there seems room for using the data for service assessment and improvement.

Certain amounts of experimentation seem inevitable given the fact that we are in a very different operating environment now as opposed to ten years ago. While it may be extremely difficult to make sense of inconsistent data elements and formats, more effort is necessary to direct our attention to actions that can further enhance service delivery and problems that can be corrected using the data. Thus, libraries should carefully consider, outline, and detail the areas where data collection and analysis is needed in *their* libraries.

Libraries Need to Maintain Open and On-Going Effective Communication with Data Sources Including Database Vendors, Users, and Internal Staff.

Clearly, inconsistent and non-standardized vendor reports pose a serious problem to libraries. It puts significant strain on the part of libraries to collect and process needed information. Even more problematic are the vendors who do not provide any information. On the other hand, database vendors need to know why libraries need these statistics and how they are going to use them. Although libraries need to speak with "one voice" as to definitions, report formats, etc., libraries also need to have realistic expectations regarding vendors' capabilities in terms of generating useful information.

There is some concern among the library community as to the reasons why vendors may be reluctant to provide usage statistics. Some participants indicated a fear that if the data were provided the library might then cancel services. With more database vendors showing interest in providing usage measures, there is considerable likelihood that we can make a good progress in this area. While a concerted effort like the E-Metrics project will play an important role in initiating the process, it is also important for individual libraries to keep open and effective on-going communications with vendors in terms of service delivery and providing usage statistics.

Effective communication regarding issues outlined in this report will also have to occur between library and other constituencies including user communities, university administration, and library staff. Understanding their needs for statistics and measures is an important step toward quality service and improved performance. Ongoing dialogue with the vendor community regarding statistics is essential for developing a mutually beneficial data reporting system.

Libraries Need to Develop Strategies and Skills to Produce Information Products for Organizing and Presenting data.

Libraries need to produce effective assessment products for networked services and resources with the resources they have available currently. Libraries have to wrestle with ways in which they can package information regarding networked services and disseminate it effectively. For instance Yale and other libraries have developed a central staff website dedicated to usage statistics. The University of Pennsylvania Library's high quality brochures are another good example.

At an individual level, one of the highly useful skills necessary for many librarians is the ability to utilize data processing programs such as Microsoft Excel spreadsheet or Access database software. Excel has shown itself as the de facto tool for organizing raw data and performing necessary analysis such as charting graphs and summary tables. It is evident in the library-generated sample reports that some of the librarians have excellent skills using tools like Excel. Presentation of the data affects and is directly related to its reception and use.

One activity libraries can do in this area is to provide training programs for staff to use advanced data analysis and presentation tools. Another is to promote and encourage high quality information products designed for audiences within and outside of libraries. Certain data presentation templates need to be used consistently across library publications. Books written by information design experts such as Edward Tufte (1990, 1992, and 1997) and Jakob Nielson (1999) offer excellent guidelines and examples.

In conclusion, while libraries are making early progress in gathering data on electronic information use, a range of improvements can occur for more systematic and fruitful measurement efforts. Some of the recommendations discussed in this section relate to developing a culture of assessment, new organizational structures for evaluation and data collection, decision-oriented data gathering, and encouraging measurement to be a key component in strategic planning. Other suggestions outlined in this section are more practical: keeping an open and ongoing communication process with vendors and users; having a dedicated person responsible for the library's overall data needs; and, developing high-quality information products to disseminate library performance.

3. Next Steps

Next steps in Phase Two of the E-Metrics Project are outlined in the original Project Proposal submitted to ARL, April 27, 2000, and will not be repeated here. These steps will be informed by the findings and results from Phase I. Key activities for Phase II include the following.

Work with Major Vendors to Standardize Usage Reports

The amount of effort and resources that go into collecting vendor reports have become inordinate in many research libraries. This is an unintended consequence as libraries' collections are becoming distributed over the network. Even a well-intentioned effort to share databases can result in incomplete and inconsistent data that are difficult to summarize and use. As we have shown in the vendor report comparison section, there is a wide variation not only in the kinds of measures being reported but also the way reports are formatted and delivered to libraries.

Before we proceed with meeting with vendors, it is absolutely critical that the research library community work together and agree on the core set of measures required from database vendors and the data delivery methods. This work will build upon initiatives like the ICOLC *Guidelines* *for Statistical Measures of Usage of Web-based Indexed, Abstracted, and Full text Resources*, as well as other projects in process.

The ARL Working Group on Database Vendor Statistics (WG) under the E-Metrics Project will be used as a primary channel and catalyst for the effort. During the next Phase of the study the WG will develop a written statement discussing their needs for statistics and measures, propose some standardized definitions for selected statistics and measures, and begin discussions with selected vendors on these needs.

Continued Sharing of Project Information

There is a significant overlap in terms of what each library is doing to collect and process various networked statistics and measures. For example, with regard to vendor reports, research libraries all contact more or less the same vendors for usage reports, receive the reports in the same format, process them in hopes to summarize and extract intelligence from the data. There is a significant overlap of effort to facilitate and automate the process. On the other hand, there are also considerable differences among participants as to their data collection and reporting activities. The study team will continue to post such information on the list (arl-emetrics@arl.org) and look forward to feedback from participating libraries regarding the Phase I report.

Develop a Set of Core Performance Measures for Networked Resources and Services

A written methodology will be completed to propose and develop these measures and field test them at selected participant libraries. Separately a short written manual will be developed and describe the data collection and analysis techniques and methods for each performance measure. Currently, the study team anticipates that the initial core statistics and measures will result from findings in the Phase I report. We also anticipate ongoing discussions with lead participants as to the development and refinement of these statistics and measures. Finally, it should be pointed out that the development of these statistics and measures will need to be coordinated with the work being done by the vendor statistics working group. An issue here is the degree to which the vendor statistics working group can reach agreement as to key measures and issues and work to resolve them with the vendors.

Meetings

Members of the study team and the project principals will present findings from Phase I at the CNI Winter meeting in San Antonio, December 7-8, 2000. We hope to obtain feedback and suggestions from the project briefing session to inform the development of statistics and measures. The project briefing session will be organized to encourage such feedback.

The vendor statistics working group will be meeting in conjunction with the ALA midwinter meeting, Friday, January 12, 2001 1-4:00 PM in Washington, DC. At this meeting we hope to continue identifying measures and statistics that the ARL community believes most important to be produced from vendor-based data. We also intend to continue coordinating the activities among interested organizations in developing statistics and measures for networked services at this meeting and others being held in conjunction at ALA Midwinter.

Currently, there are plans being developed for a workshop to be held in February 2001 and sponsored by NISO and NCLIS to review standards for a number of library statistics including network and vendor statistics. The study team anticipates that representatives from ARL, the study team, and the WG will participate in this meeting.

The study team and ARL principals have scheduled Monday, April 9, 2001, 9:00 AM to Noon (in conjunction with the CNI conference in Washington, DC) to meet with participating E-Metrics libraries. The purpose of the meeting will be to review project status, discuss proposed statistics and performance measures, and continue activities on working with database vendors for selected statistics. Specifics about this workshop and its content/organization will be forthcoming as the project continues.

4. Developing Statistics and Performance Measures for Networked Services

The Phase I report suggests that there is some considerable activity among the participating libraries regarding the development of statistics and performance measures to describe activities in the networked environment. The report also suggests that it may be too early to identify "best practices" until there is more knowledge about this topic. The report also suggests that there is much work yet to be done – and there are a number of issues that will require additional attention.

The information obtained from the Phase I effort will provide an excellent base to continue project activities in Phase II. As the project moves forward it will be important for participating libraries to take an active involvement in the vendor statistics working group, to review and participate in the development of proposed statistics and performance measures, and to provide feedback and suggestions to the study team as Phase II continues.

References

Bertot, John Carlo, McClure, Charles R. and Ryan, Joe. (2000, October 15). *Statistics and performance measures for public library network services*. Chicago: American Library Association.

Lakos, Amos. (1999). The missing ingredient - culture of assessment in libraries. *Performance Measurement and Metrics, 1*(1), 3-7.

Nielson, Jakob. (1999). *Designing web usability: The Practice of Simplicity*. New Riders, Publishing.

Nielson, Jakob. *www.useit.com*.

Tufte, Edward R. (1990). *Envisioning Information*. Graphics Press.

Tufte, Edward R. (1992). *The visual display of quantitative information*. Graphics Press.

Tufte, Edward R. (1997). *Visual explanation: Images and quantities, evidence and narrative*. Graphics Press.

Appendix A

Usage Measures for Electronic Resources
ARL Project Planning Session.
Regal McCormick Ranch Resort
Scottsdale, Arizona, February 27-29, 2000

Introduction

The objective of Usage Measures for Electronic Recourses ARL Project Planning Session, held in Scottsdale, Arizona, was to establish a project on usage measures for electronic information resources that would help ARL libraries identify a set of measures for assessing electronic services and resources in an academic setting.

The purpose of the session was to introduce the project and allow libraries to describe the character and nature of electronic services provided.

Martha Kyrillidou and Julia Blixrud prepared and distributed a short survey before the project planning meeting and compiled the responses. Wonsik "Jeff" Shim, project consultant from Florida State University, analyzed responses of the participants to the questions and presented a summary of findings at the meeting.

Of 35 ARL institutions (not including the California Digital Library at the time) that received the survey, 22 libraries responded to the survey. Also, 24 institutions have decided to participate in the project. Among the 22 responses to the survey, 15 libraries are now participants in the project.

The questions were the following:

1. What do you need to know to make good resource decisions related to the provision of electronic services or purchase of networked resources? What information do you need to communicate to decision makers about electronic resources?

2. What data do you need to measure the impact of electronic services and resources? Do you have this data available now?

3. What are you currently doing at your institution in terms of measuring electronic services and resources? Describe your current role in developing measures for assessing electronic resources and services.

4. What are your primary goals in participating in this project planning session?

Findings

The following summarizes the responses of the participants to the questions that provide some indication of data collection activities at the responding libraries. Responses were summarized and tabular presentations of findings are provided following each question.

1. What do you need to know to make good resource decisions related to the provision of electronic services or purchase of networked resources? What information do you need to communicate to decision-makers about electronic resources?

Table 1A shows that there are several important issues that need to be considered before making any decision related to provision of electronic services or purchases of networked services. To illustrate, sixteen participants would like to see some kind of statistics and performance measures in ARL member libraries so that they can show "costs and values of the services for their user community." Also, the need for quantitative and/or qualitative data on users and their information seeking behaviors were also pointed out by sixteen ARL member libraries' representatives. Fourteen respondents noted that the nature of use and access was an important issue for library decision makers "to determine which factors contribute to the success of the services and resources" while thirteen individuals paid particular attention to their users' satisfaction. Seven people focused on lack of uniformity and standardization of performance measures because, as one noted, "the lack of uniformity or consistency among electronic resource providers makes their usage data less valuable than it might be." As a temporary solution, retrieving the statistics available from vendors to the ARL member libraries was offered by ten of the participants. Finally, in relation to the provision of electronic services or purchase of networked resources, five of the libraries would like to know the effects of electronic resources on existing services, such as personnel and reference services.

Table 1A:
What do you need to know to make a good resource decisions related to the provision of electronic services or purchase of networked resources?

Statistics and performance measures	16
Users and their information seeking behaviors	16
Nature of use and access	14
User satisfaction	13
Access to statistics available from vendors	10
Uniformity/standardization of performance measures	7
Effects of electronic resources on services (e.g., personnel)	5

In reference to the second part of the question as shown in Table 1B, cost and effectiveness analysis (14) was the top issue among the respondents. Networking and hardware/software infrastructure and interfaces and ease of use were other important issues highlighted by eleven respondents. Among them, ten library representatives would like to know whether electronic resources came with links with alternative formats, such as paper versions. Five individuals believed that trial versions and demonstrations before purchasing and workshops after purchasing needed to be provided by vendors. Concerns over reliability of vendor services and sources of content of available resources were pointed out by four respondents. Finally, there were also other issues, identified by three representatives, that ARL members needed to consider while making a good decision about electronic resources and services: Accurate product information, networking and installation requirements, scope of resources, maintenance and support services and licensing issues.

Table 1B: What do we need to communicate to decision-makers about electronic resources?	
Cost and effectiveness analysis	14
Networking and hardware/software infrastructure	11
Interfaces and ease of use	11
Links with alternative formats (such as, paper version)	10
Workshops, trials and demonstrations	5
Reliability of vendor services	4
Sources of content	4
Accurate product information	3
Scope of electronic services	3
Maintenance and support services	3
Licensing issues	3

2. What data do you need to measure the impact of electronic services and resources? Do you have this data available now?

Table 2A: What data do you need to measure the impact of electronic services and resources?	
Number of use	14
Number of users	13
Number of logins and denials	12
Number of hits (Full-text vs. index)	9
Number of downloads	8
Number of searches	6
Response and access time	6
Number of reports	3
Service costs	3
Number of prints	2
Number of reference services	2
Staff	2

Table 2A lists the issues related to measuring the impact of electronic services and resources among the ARL member libraries. Fourteen of the members would like to know the number of uses through electronic services and resources. Also, number of users (13) and number of logins and denials (12) were two topics on which participants heavily agreed. Particularly, the library representatives were interested in knowing the number of hits (9), number of downloads (8), number of searches (6), and response and access times (6). Three respondents needed to know periodically reporting option of the resources and service costs of electronic services. Finally, two respondents wanted to know number of prints, number of reference services and the impact on staff for electronic services and resources in ARL member libraries.

Among the respondents, eight of the members have some data about electronic services and resources although fourteen of them had no data available on the services and resources provided (see Table 2B). Those who have the data complained that the data are not consistent across providers or products. They seem to agree on that "the usefulness of data available is hampered by lack of consistency across resources, lack of comparable data for print resources and offline services, lack of consistent longitudinal data/studies, lack of consistency across institutions, and lack of recognized methodologies for evaluation." In addition, some suggested that the ICOLC guidelines for statistical measures of usage of web-based indexed, abstracted, and full text resources could be a workable guide until industry standards are developed to measure performance and outcomes for electronic resources.

Table 2B: Do you have this data available now?	
Respondents that have data	8
Respondents that do not have any data	14

3. What are you currently doing at your institution in terms of measuring electronic services and resources? Describe your current role in developing measures for assessing electronic resources and services.

The participants have been measuring and looking for some indication of uses, costs, titles, logins and turnaways, and receiving feedback from staff and users for electronic services and resources (see Table 3A). Specifically, thirteen were counting uses and accesses in their libraries although ten of them were gathering the data from vendors, as they needed. Cost and benefit analysis was another activity among five of respondents. Also, five were dealing with counting titles and number of logons and turnaways. Finally, three respondents were surveying their users and looking for feedback from their staff as a way of measuring their electronic services and resources available.

Table 3A: What are you currently doing at your institution in terms of measuring electronic services and resources?	
Counting uses and access	13
Gathering data from vendors	10
Cost and benefit analysis	5
Counting titles	5
Number of logons and turnaways	5
Surveying users and receiving feedback from staff	3

Table 3B: Describe your current role in developing measures for assessing electronic resources and services	
Evaluation analyst role	8
Budgeting role	3
Benchmarking role	2
Acquisitions librarian or collection manager role	2
Coordinator role	2
Other roles	5

As shown in Table 3B, while measuring their electronic services and resources, the respondents described themselves differently. For instance, eight of the respondents described themselves as evaluation analysts while three stated that they carried budgeting role in their settings. Benchmarking, acquisitions librarians or collection manager, or coordinator roles for measuring these resources and services were defined by two participants. Finally, five responses described themselves in other roles, such as web manager and other managerial roles.

4. What are your primary goals in participating in this project planning session?

This question was aimed at finding out the reasons of participation in the ARL Project Planning Session and identifying the primary goals for participation. According to the responses to the question (see Table 4), fourteen of the participants were interested in participation in development of industry standards to measure performance and outcomes for electronic resources. Five would like to benchmark their activities to other ARL member libraries if ARL members' shared their experience with others as stated by four of the respondents. Finally, two participants were interested in library effectiveness and quality as a goal in participation in the session. In conclusion, as the findings indicated, the members would very much liked to see a set of measures for assessing electronic services and resources in an academic setting.

Table 4:
What are your primary goals in participating in this project planning session?

to participate in development of industry standards to measure performance and outcomes for electronic resources	15
to benchmark	5
to share other ARL members' experience	4
interested in library effectiveness and quality	2

Appendix B

E-Metrics Project

ARL Survey on Statistics and Measures for Networked Services and Resources

The purpose of this survey is to gather specific information about current data collection and use practices in the area of electronic resources and services among the participants of ARL's E-metrics project to inform the investigators as they prepare various site visits. This preliminary survey will help the study team identify the existing data gathering effort that need to be studied further and documented in the best practices report. Follow up site visits are expected to be conducted to select institutions in the month of August.

The survey is being conducted by Chuck McClure<cmcclure@lis.fsu.edu> and Wonsik "Jeff" Shim <wshim@lis.fsu.edu> at Information Use Management and Policy Institute at Florida State University. If you have any questions about this survey, please send us an email at wshim@lis.fsu.edu.

The survey will be best responded to by a librarian or a staff member who is knowledgeable about statistics and measures relating to electronic services and who is involved in the process of gathering and processing that information. The survey is **not** intended to gather an **exhaustive** list of measures of electronic resources and services but rather **representative** statistics and measures your library is collecting.

You are receiving this survey because your institution has agreed to participate in the E-Metrics project. By answering survey questions, you are agreeing to participate in the project. Collected information will appear in published results only in aggregate statistics or form. The identities of the respondents will be used only for the purpose of establishing contacts with the libraries for follow-up phone interviews and/or site visits. The information will be kept in a secure place and destroyed no later than December 31, 2006, five years after completion of the study.

Your participation in this survey is very important. Thank you for your support for this project.

Please return the survey by August 11, 2000 by filling in your responses in the attached Microsoft Word document or RTF (rich text format) file. Please send the file as an email attachment to wshim@lis.fsu.edu. Finished survey can also be faxed to (850)644-6253. Attn Wonsik "Jeff" Shim

Part 1. DATA COLLECTION

Before you begin, please tell us about yourself so we may contact you in the future.

Institution:

Name:

Position/Title:

Email Address:

Phone Number:

Please indicate the types of data elements or statistics your library gathers, along with the source and the frequency of data collection. When you list the measures, please use the terminology as you use it in your library. If you need additional space, use the back of the page or insert additional rows in the following Word Table.

Collected Data	Frequency of data collection				Began Collecting Since	Is this required?	
Patron Accessible Resources : E.g. # of electronic database titles served, # of library web pages in service, # of e-books, # of full-text e-journals, # of librarians providing electronic reference.	Weekly, Monthly, Quarterly, Yearly (Check)				(approximately)	Is the measure requested by anyone? For instance, university administration or outside funding source.	
	W	**M**	**Q**	**Y**	**month/year**	**No**	**If Yes, by whom?**
Patron Use : E.g. # of logins or visits, # of library web pages accessed, # of documents downloaded, # of electronic reference service transactions.	Frequency (Check)				(approximately)		
	W	**M**	**Q**	**Y**	**month/year**	**No**	**If Yes, by whom?**

Collected Data	**Frequency of data collection**				**Began Collecting Since**	**Is this required?**	
Users : E.g. % of undergrads who have used the e-books, % of grads who have used the electronic reference service (# of users in a group by type of services)	Frequency (Check)				(approximately)		
	W	**M**	**Q**	**Y**	**month/year**	**No**	**If Yes, by whom?**
Cost : E.g. $ per electronic document delivered, cost of database subscription fee (average or total), expenditures for electronic journals (ongoing, leases, subscriptions),	Frequency (Check)				(approximately)		
	W	**M**	**Q**	**Y**	**month/year**	**No**	**If Yes, by whom?**
Other : Beyond the above measures, please indicate below if your library collects other types of data such as service quality, the effects of library use on research and instruction or the percent of library users satisfied with libraries services.	Frequency (Check)				(approximately)		
	W	**M**	**Q**	**Y**	**month/year**	**No**	**If Yes, by whom?**

Part 2. DATA USE

1. With whom do you share the collected data on electronic resources and services?(Check all that apply)

[ ] Among Library Managers
[ ] With University Administrators
[ ] Among Library Staff
[ ] Others (Specify) ______________________________

2. Please indicate the kinds of decision making for which collected data is being used. (E.g. journal renewal/cancellation, redesign of library webpages)

____

____

____

____

____

Part 3. ISSUES

Please list the three most important issues your library faces in the collection of statistics and measures to describe networked services and resources.

1.____

____

____

2.____

____

____

3.____

____

____

Part 4. PARTICIPATION IN THE BENCHMARKING PROCESS

Please indicate below if your library wants to be considered as a best practice in one or more areas in which the library has been collecting data and has a systematic process put in place for some time (6+ months).

Users of networked information services and resources	[ ]
Uses of networked information services and resources	[ ]
Quality of networked information services and resources	[ ]
Cost of networked information services and resources	[ ]
Staffing and training	[ ]
____________________	[ ]
____________________	[ ]

A member of the study team may contact you for a follow up interview and/or site visit.

Part 5. SAMPLE REPORTS

Please attach any sample reports and data compilations of statistics and measures for describing electronic services and resources. You can also fax them to Wonsik "Jeff" Shim at (850)644-6253.

THANK YOU FOR YOUR SUPPORT.

Appendix C
(available at http://www.library.yale.edu/consortia/webstats.html)

International Coalition of Library Consortia (ICOLC)

GUIDELINES FOR STATISTICAL MEASURES OF USAGE OF WEB-BASED INDEXED, ABSTRACTED, and FULL TEXT RESOURCES

(November 1998)

INTRODUCTION

The use of licensed electronic information resources will continue to expand and in some cases become the sole or dominant means of access to content. The electronic environment, as manifested by the World Wide Web, pro vides an opportunity to improve the measurement of the use of these resources. In the electronic arena we can more accurately determine which information is being accessed and used. Without violating any issues of privacy or confidentiality we can dramat ically enhance our understanding of information use.

The participating consortia of the ICOLC have a responsibility to their library members to ensure the provision of usage information of licensed electronic resources. Information providers should want the same information to better understand the market f or their services as well as to create an informed customer base. These mutual interests can be best met by defining and creating a common set of basic use information requirements that are an integral and necessary part of any electronic product offering . These requirements apply to vendor operated web sites and to software provided to libraries or consortia for local operation. Information providers are encouraged to go beyond these minimal requirements as appropriate for their specific electronic resources.

These ICOLC guidelines draw heavily upon the guidelines developed by the JSTOR Web Statistics Task Force: David Farrell, Berkeley, Chair; Jim Mullins, Villanova; Kimberly Parker, Yale; Dave Perkins, CSU-Northridge; Sue Phillips, Texas; Camille Wanat, Berkeley; Kristen Garlock, JSTOR, ex-officio. The ICOLC guidelines reflect modifications to maximize their broad applicability to the diversity of resources licensed by many ICOLC members.

1. REQUIREMENTS

Each use element defined below should be able to be delineated by the following subdivisions;

1. By each specific database of the provider
2. By each institutionally-defined set of IP addresses / locators to subnet level
3. By total consortium

4. By special data element passed by subscriber(e.g., account or ID number)

5. By time period. Vendor's system should minimally report by month. For each month, each type of use should be reported by hour of the day, and vendor should maintain 24 months of historical data

   Use Elements that must be provided are:

   Number of queries (Searches) categorized as appropriate for the vendor's information. A search is intended to represent a unique intellectual inquiry. Typically a search is recorded each time a search form is sent/submitted to t he server. Subsequent activities to review or browse among the records retrieved or the process of isolating the correct single item desired do not represent additional searches, unless the parameter(s) defining the retrieval set is modified through resubmission of the search form, a combination of previous search sets, or some other similar technique.

   Number of Menu Selections categorized as appropriate to the vendor's system. If display of data is accomplished by browsing (use of menus), this measure must be provided (e.g. an electronic journal site provides alphabetic and subject-based menu options in addition to a search form. The number of searches and the number of alphabetic and subject menu selections should be tracked).

   Number of sessions (Logins), if relevant, must be provided as a measure of simultaneous use. It is not a substitute for either query or menu selection counts.

   Number of turn-aways, if relevant, as a contract limit (e.g., requests exceed simultaneous user limit).

   Number of items examined (i.e., viewed, marked or selected, downloaded, emailed, printed) to the extent these can be recorded and controlled by the server rather than the browser:

   1. Citations displayed (for A&I databases)

   2. Full text displayed broken down by title, ISSN with title listed, or other title identifier as appropriate

      1. Tables of Contents displayed
      2. Abstracts displayed
      3. Articles or essays, poems, chapters, etc., as appropriate, viewed (e.g., ASCII or HTML) or downloaded (e.g. PDF, email)

4. Other (e.g., image / AV files, ads, reviews, etc., as appropriate)

The ICOLC is preparing a separate guideline on Technical Performance of Web-based Services for reporting of system related parameters (e.g., downtime, response time).

2. PRIVACY AND USER CONFIDENTIALITY: Statistical reports or data that reveal confidential information about individual users must not be released or sold by information providers without permission of the consortium and its member libraries.

3. INSTITUTIONAL OR CONSORTIAL CONFIDENTIALITY: Providers do not have the right to release or sell statistical usage information about specific institutions or the consortium without permission, except to the consortium administrators and member libraries. Use of institutional or consortium data as part of an aggregate grouping of similar institutions for purposes of comparison does not require prior permission as long as specific institutions or consortia are not identifiable. When required by contractual agreements, information providers may furnish institutional use data to the content publishers.

4. COMPARATIVE STATISTICS: Information providers should provide comparative statistics that give consortia a context in which to analyze statistics at the aggregate institutional (consortium member) level. For example, a grouping for purposes of comparison should be compiled by the information provider (e.g., statistics from an anonymous selection of similar institutions), or it might be a grouping composed on demand (e.g., statistics from all campuses in a consortium, presented either anonymously or not, as desired by the participating institutions).

5. ACCESS / DELIVERY MECHANISMS / REPORT FORMATS: Access to statistical reports should be provided via web-based reporting systems and be restricted by IP address or another form of security such as passwords. Institutions should be able to authorize access to their use data by other institutions in the consortium if they desire.

Information providers should maintain access to tabular statistical data through their web site (updated monthly) which a participant can access, aggregate and manipulate on demand. When appropriate, these data also should be available in flat files containing specified data elements that can be downloaded and manipulated locally. Information providers are also encouraged to present data as graphs and charts.

Adopters of This Statement

This statement was adopted in principle by member representatives of the "International Coalition of Library Consortia" (ICOLC) whose institutions are listed below. This statement does not necessarily represent the official views of each consortium listed. All consortia listed are in the United States unless otherwise noted.

Consortia whose member representatives adopted this statement:

ALICE (the Appalachian Library Information Cooperative)
AMIGOS Bibliographic Council, Inc.
Arizona Universities Library Consortium (AULC)
BCR
Big 12 Plus
Boston Library Consortium
British Columbia Electronic Library Network (Canada)
California Digital Library (CDL)
The California State University.
Canadian National Site Licensing Project (CNSLP)
Colorado Alliance

Committee for Institutional Cooperation (CIC)
CAUL (Council of Australian University Librarians)
Council of Prairie and Pacific University Libraries (COPPUL) (Canada)
CURL (United Kingdom)
Florida
Center for Library Automation
GALILEO
Illinois Cooperative Collection Management Program (ICCMP)
Illinois Library Computer Systems Organization (ILCSO)
INCOLSA
Israel Center for Digital Information Services
Louisiana Library Network
MERLIN
Michigan Library Consortium
MINITEX Library Information Network
MIRACL
MOREnet
NERL
Netherlands Association of University Libraries, Royal Library, and Library of the Royal Academy of Sciences (Dutch acronym: UKB)
Network of Alabama Academic Libraries
New England Law Library Consortium (NELLCO)
Novanet (Canada)
OhioLINK
Ontario Council of University Libraries (OCUL)
Orbis
PALINET
Pennsylvania Academic Library Consortium, Inc. (PALCI)
Pioneer, Utah's Online Library
PORTALS
SCELC - Southern California Electronic Library Consortium
SCONUL (Ireland and United Kingdom)
Solinet
Southeastern Wisconsin Information Technology Exchange (SWITCH)
Sub-Committee on Libraries of the Conference of Rectors and Principals of Universities of Quebec (CREPUQ).
TexShare
TriUniversity Group of Libraries (TUG) (Canada)
The Triangle Research Libraries Network (TRLN)
UNILINC (Australia)
University of Texas System Digital Library
Utah Academic Library Consortium
VIVA (The Virtual Library of Virginia)
Washington Research Library Consortium
Wisconsin InterLibrary Services (WILS)

About the International Coalition of Library Consortia (ICOLC)

The International Coalition of Library Consortia (ICOLC) first met as the "Consortium of Consortia" (COC) in 1996. The Coalition is an international, informal group currently comprising over ninety library consortia in North America, Europe , Australia, Israel, China, and South Africa. The coalition membership serve primarily higher education institutions by facilitating discussion among consortia on issues of common interest. The ICOLC conducts meetings throughout the year dedicated to kee ping its members informed about new electronic information resources, pricing practices of electronic providers and vendors, and other issues of importance to consortia directors and governing boards. The Coalition also meets with the information provide r community, creating a forum for discussion about product offerings and issues of mutual concern.

More information about ICOLC can be found at http://www.library.yale.edu/consortia.

For further information about this document, please contact:

- **Tom Sanville**, ***Executive Director, OhioLINK***

  Suite 300, 2455 North Star Road, Columbus, OH 43221
  Phone: 614-728-3600, ext. 322
  Email: tom@ohiolink.edu
  Fax: 614-728-3610

- **Sue Phillips, *Director, University of Texas System Digital Library,* University of Texas**

  P. O. Box P, Austin, TX 78713-8916
  Phone: 512-495-4350
  Email: s.phillips@mail.utexas.edu
  Fax: 512-495-4347

Appendix D

(available at http://www.library.yale.edu/consortia/webstats.html)

ELECTRONIC VENDOR STATISTICAL REPORTING CAPABILITIES

Describe the statistics you provide, and discuss whether your statistical reporting complies with guidelines developed by the International Coalition of Library Consortia, which may be found at www.library.yale.edu/consortia/webstats.html.

Ancestry.com (Spring 2000)	We are currently working on statistics program that will allow your library to see stats on a daily, weekly, monthly, and annual basis. At the moment, we are looking at a company called SuperStats.com (<http://www.superstats.com/>), which will allow us to provide any statistical data needed for our clients. We will keep our subscribers posted on the progress of this option.
Ardenonline - Works of Shakespeare (Fall 1999)	We can provide statistics in accordance with the ICOLC guidelines if required.
Aries Systems (Spring 2000)	For each institutional customer we record aggregated statistical information such as: date and length of search sessions, number of databases and thesauri searches, documents (abstracts) and summaries viewed. These statistics are available upon request. However, for reasons of privacy, we do not track or record any individual search strings.
Baker and Taylor EBIS (Spring 2000)	Statistics provided are related to user id accession of the database. The IP address method of using the database cannot be traced for certain aspects of reporting. Statistics can include, but are not limited to the following: amount of searches, types of searches, last login, amount of carts, amount of titles in a cart, amount of dollars allocated per cart, and amount of discounted dollar amount allocated per cart. In reviewing the International Coalition of Library Consortia, we comply in part with the guidelines addressed in their web page.
Bell & Howell (Spring 2000)	We provide monthly reports that allow libraries to review their ProQuest activity. These usage statements provide statistical information about the number of articles (from each database to which the library subscribes, and by each title in that database) delivered electronically to users for viewing or emailing. You can represent individual libraries, or group them (for example, by county) in whatever fashion, and to whatever level of detail, you like. We are working to develop these reports in accordance with the ICOLC guidelines. Compliance with these guidelines is underway, and planned for completion by Summer 2000. Currently, ProQuest provides the following compliant functionality. • usage reports available online with an administrator's account (similar to the way our customers currently access the Library Holdings function) • reports available on demand (with information updated monthly) • summary reports delivered in HTML • detailed reports e-mailed in ASCII delimited text The following functionality is planned for Summer 2000. • reports expanded to include information on searches • cumulative reports (for example, quarterly, annually) • inclusion of full journal title vs. abbreviated version

	• ISSN added • daily updates to usage statistics (month-to-date)
Big Chalk (Spring 2000)	Reports detailing usage by building and cumulative usage by group or region are available. Usage Reports can be supplied monthly or quarterly. Currently, the state or regional sales representative supplies usage reports. Access to usage statistics via the World Wide Web is currently under development dependent on the username of the account. For security reasons, to access any usage report a username and password will be required. Statistic Definitions: The following are short definitions for each of the statistical terms used in a returned usage report. These usage terms consist of total queries, total retrievals, and hours connected. The following definitions are compliant with the definitions set by The International Coalition of Library Consortia (ICOLC). Queries: A query or search is defined as each time a search form is sent to the server (each time the search button is clicked). Browsing through retrievals from a single search do not represent additional searches. If a query is refined by altering the query phrase or placing additional search parameters on the search form, an additional query is registered. Retrievals: A retrieval is recorded each time the user clicks or opens a document on the result list. Additional functions of printing, saving, or e-mailing the document are not recorded as additional retrievals. Hours: "Hours Connected" is defined as the amount of time an account is logged on to Electric Library. This number is recorded in hours and is rounded to the nearest whole hour. This number does not represent individual sessions, but instead a cumulative account of access to eLibrary for a single username.
Bowker - Books in Print (Spring 2000)	Bowker takes the ICOLC "Guidelines for Usage Statistics" very seriously, and is working toward fulfilling as many of those Guidelines as possible as the product develops. Current booksinprint.com statistical report functionality: time reporting for the calendar month, average usage by day of the week (e.g., Mondays, Tuesdays), average usage by hour of the day (e.g., 12:00 pm, 1:00 pm, 2:00 pm), broken down by individual IP address and username/password. The statistics will be compiled on a monthly basis, with a rolling six-month archive. Bowker is developing functionality to include on-screen displays of logins, title searches, author searches, ISBN searches, etc.
Bowker - Ulrich (Spring 2000)	Bowker takes the ICOLC "Guidelines for Usage Statistics" very seriously, and is working toward fulfilling as many of those Guidelines as possible as the product develops. The current version of ulrichsweb.com does not provide for usage statistics. However, version 2.0, expected to be released this summer, will provide site location login numbers and percentages, average daily activity (logins by site location, searches by site location, browses by site location and detailed views accessed by site location), and average hourly activity (average number of searches by hour of the day).
Britannica (Fall 1999)	Usage statistics for Britannica Online for each institution are available to the Britannica contact at the subscribing institution, displaying daily and running totals of the numbers of Britannica URLs accessed as Queries ("Why is the sky blue?"), Documents (articles opened), and Other (images, etc.). Usage statistics are available for the IP addresses specified by the institution or by the Username/Password assigned in the Britannica cookie-based authentication. A customer-accessible Web system is available, and currently being used by most of the Consortium Adopters of these standards.
Cambridge Scientific Abstracts (Spring	CSA provides online usage statistics for all IDS accounts, which

2000) Cambridge Scientific Abstracts (cont.)	comply with the ICOLC guidelines. Each customer can access their own usage report. Access to these usage reports is restricted by IP address and username and password. The usage report summarizes monthly usage in three parts: 1. The first part reports the number of times your username and password were used to access the Internet Database Service each month. (Earliest available data is from September 1996) 2. The second part shows a count of the number of searches that were submitted by persons accessing with your username and password. (Earliest available data is from April 1997) 3. The third part reports the number of times each database was searched. Since it is possible to search more than one database with each submitted search, this count will be higher than the number of searches submitted. (Earliest available data is from September 1996).
CARL's Dialog Basic Collection (Spring 2000)	Dialog@CARL usage reports are available via e-mail on a weekly or monthly basis or both. The reports include: total searches (broken down by number of searches with hits, number of searches with zero hits, and total of both); total number of sessions; number of turnaways due to all ports in use; individual database usage (number of searches with hits in each database accessed, number of searches with zero hits, and total of both per database); and number of searches by domain/IP address. Statistics can also be sent in comma-delimited format if the library wishes to import and manage the data in its own spreadsheet program. For consortia, the above statistics in either standard or comma-delimited format can be broken down by individual institution. The Dialog@CARL statistical reporting partially complies with the guidelines developed by the International Coalition of Library Consortia. Dialog@CARL provides reporting for each specific database, by each institutionally defined set of IP addresses, by total consortium, and by special data element passed by subscriber. In addition, number of queries, number of sessions, and number of turnaways are all recorded.
Chadwyck-Healy (Fall 1999)	We currently do not provide usage stats that are in line with the ICOLC guidelines. However, the in-progress software enhancements mentioned in item #4 also include planned statistical reporting capabilities. We are using the ICOLC statement as our guide.
CINAHL DIRECT (Spring 2000)	Cinahl Information Systems provides usage reports containing the name of the database in use, the number of the concurrent user, the sign on and sign off times, and the total elapsed time for the session. The reports can be generated to meet your schedule.
EBSCO (Spring 2000)	EBSCOhost provides the ability to track usage and provide statistical reports on virtually any client/server communication. The library administrator will have the ability to access and control all user configurations and generate reports automatically on-site. Usage statistics can be used to measure how often titles and databases are searched. Title, database and session usage statistics can be collected for specific time periods (monthly or annually), limited to a specific data field (i.e. ISSN) and/or searched in a particular way (i.e. a database name or number of abstracts downloaded/printed). 1. Title Usage Statistics: Library administrators will be able to monitor exactly which titles are being accessed with EBSCOhost and be able to determine: • Number of abstracts browsed/printed/downloaded per title • Total number of full text articles/pages browsed for each title 2. Session Usage Statistics: Library administrators will also be able to

	monitor session activity and be able to determine: The number of sessions Number of searches Average number of hits per search The user profile which is used most often 3. Database Usage Statistics: Library administrators will be able to monitor and track database usage in the following areas: 4. Total number of searches for each database 5. Average number of hits per search for each database 6. Total number of abstracts browsed/printed/downloaded from each database 7. Total number of articles e-mailed for each database
Electric Library (Spring 2000)	Electric Library can provide reports monthly detailing number of queries, number of retrievals, and time connected to our service for each institution. Additionally, for each institution, reports showing the most accessed publications can be provided on a monthly basis. We believe that our reports comply with the International Coalition of Library Consortia guidelines - we can provide reporting on our sole database, by each set of IP addresses, by consortium, by username (where applicable), and on a monthly basis. Please note that those institutions using IP addresses for authentication to Electric Library would be unable to obtain reports of individual user activity (institutions authenticating via Username/Password would be able to retrieve this information, however).
Facts on File (Spring 2000)	We can offer statistical reporting by IP address or password to our subscribers. Please contact Ben Jacobs (see 12 below) to discuss specific needs.
Gale Group (Spring 2000)	InfoTrac and GaleNet statistics are in partial compliment with ICOLC statistical reporting requirements. The Gale Group is undertaking a project to consolidate the separate statistical programs and incorporate full ICOLC compliance. Statistics will be generated for each of the various subscribing libraries. Statistical reports include: internal and external use by database with the number of logins, total connect time, average login time, number of searches, hits, marked citations, emailed and printed citations and full text. The journal list report shows the number of on-screen views and retrievals, with a breakout of full text retrievals. Time of day statistics detail number of users by time of day and day of week for the month or date range selected. Statistics can be delivered in either ASCII, Flat file (i.e. csv), or Postscript formats. In addition, the consortia can choose to receive one aggregate report for a number of sites and can also have individual usage reports sent to each library with the InfoTrac Web service. The reports list each database subscribed to by the consortia and/or location receiving InfoTrac Web services. The reports show the number of Sessions, On-Screen Views and Retrievals (e.g. local printing, email, PDF download.) The journal list report shows the number of on-screen views and retrievals, with a breakout of full text retrievals. Special statistical reports can be requested through Technical Support and delivered within two business days of the request. GaleNet Database Statistics GaleNet offers an online usage reporting service to its customers upon request. This database, updated on a monthly basis, details the usage by individual site (library, school, etc.) and/or the consortia as a whole, then by database and by type of usage (database access, image, other). We also have the ability to provide more detailed reports that cover number of sessions, average number of users, daily usage patterns, etc.
Grolier (Spring 2000)	User statistics for each account will be reported on a password-protected Web site available to system administrators and other qualified

	personnel designated by the customer. Reports are available for IP address ranges and referring URLs only, not for "cookie"-authenticated workstations, and are updated monthly. Accessibility of IP addresses behind proxy servers (subnet level) is subject to technical limitations to be determined on a case-by-case basis. Fields reported for each institutionally defined set of IP addresses include total requests, requests per day, number of files requested, hosts served, and amount of data transferred. Summaries by month, day, and time of day are also provided. Grolier agrees to the privacy and confidentiality paragraphs (nos. 2 and 3) in the ICOLC "Guidelines for Statistical Measures of Usage of Web-Based Indexed, Abstracted, and Full-Text Resources."
Grove's (Fall 1999)	Both of the Grove online products were launched recently and our usage statistics reports are still in development. Our intention is to follow the guidelines established by the ICOLC as far as these are applicable to our products.
Hoover's (Fall 1999)	We provide statistics on a request basis. Usage reports will provide daily statistics on usage on an institutional level only. This complies in part with the ICOLC.
HRAF (Spring 2000)	At the current time we have statistical information of use by month and by IP address. However, it is not aggregated by the institution or by the consortium. We are asking our provider at the University of Michigan to provide more detailed statistical information to comply with the guidelines developed by the ICOLC.
INET Library (Spring 2000)	Statistical information is gathered via our web based monitoring software. We gather bit ratios based on IP addressed or user machines. Number of visits are user specific per facility. Additional statistical information can be developed based on institutional needs, i.e.error recording per a specific IP address or site usage per specific IP address. With our priority service we can provide a significant increase in statistical information based on site visits, total hit ratios, and total files utilized. This would be developed specific to each IP address. This statistical reporting process complies in part with the guidelines developed by the ICOLC. In ICOLC's guidelines it states that "ICLOC is preparing a separate guideline on Technical Performance of web-based parameters (e.g. downtime, responsetime)." Inventive Communications will strive to become 100% compliant to these new guidelines once ICOLC publishes its version.
Information Quest (Fall 1999)	We provide usage statistics to our customers that are currently available on a quarterly basis. These statistics state the number of logins, the number of searches, purchases, online hits and much more! To determine if we meet the guidelines developed by the ICOLC, please contact lkarle@eiq.com <mailto:lkarle@eiq.com> who would be happy to discuss this.
InfoUSA (Fall 1999)	Our statistics provide each library how many searches, how many downloads & how many downloaded records. This can be a monthly, quarterly, semi-annual or annual pull. It doesn't look like our statistics are like the International Coalition of Library Consortia.
Lexis-Nexis (Spring 2000)	We will be providing web based use statistics which comply with the ICOLC guidelines.
Lightspan (Fall 1999)	Lightspan can provide statistical analysis of usage of the Lightspan Network either at the school level or by password. In other words, we can provide analysis of overall log-on activity of the Lightspan Network to determine overall rate of usage, or analysis based on usage by password. This second level of analysis is useful in determining rate of usage among teachers, students, or families to get a sense of who is

	finding value in the Lightspan Network and how it is being used.
McGraw Hill (Spring 2000)	Statistics for use by an institution will be provided starting in July of 2000. The statistics will be reported daily on a website accessible only by the subscribing institutions' librarian contact, aggregated weekly and month. All efforts are being made to comply with the ICOLCs guidelines, but may vary to the extent that our programming allows us to capture specific information.
NewsBank (Fall 1999) NewsBank (cont.)	NewsBank complies with the International Coalition of Library Consortia (ICOLC) in the following ways: NewsBank can provide usage statistics on the following use elements: • Number of Searches (Keyword and Customized) • Number of Sessions (Logins) • Number of Articles Viewed Each use element can be delineated by the following subdivisions: • By each specific database (Product) • By each institutionally-defined set of IP addresses • By total consortium • By special data element passed by subscriber (etc., Account or ID Number) Note: Usage statistics are reported daily and this data can be maintained for 24 months
NICEM (Spring 2000)	We can provide a monthly report of the number of records that result from a search. The statistical count is for each user name.
NoveList (Fall 1999)	NoveList provides statistics on a monthly basis. Statistics are available at the individual site level and the consortial level based on IP address. For example, building level statistics are available for buildings that have indicated a unique set of IP addresses. Information is provided for the following elements: • Number of queries. • Number of sessions. • Number of records viewed. Sites which provide NoveList with a contact person and e-mail address, will have monthly usage statistics e-mailed to them.
OCLC (Spring 2000) OCLC (cont.)	OCLC provides the following statistical reports for the FirstSearch service: FirstSearch Usage Reports OCLC tracks FirstSearch usage statistics and provides access to monthly usage reports via the Web. Libraries can obtain these reports at anytime from the Web (<http://www.stats.oclc.org/>). Libraries are provided with the last month's usage as well as the past twelve months of usage for a rolling 13-months of usage history. Session-level reports are available for viewing on the Web on the same 13-month, rolling schedule. Overview reports include 6 months of data. Session-level reports include: Overview reports. These reports provide data on system use such as: • the number of FirstSearch authorizations used by an institution • the number of sessions or the number of FirstSearch logons by users • the number of session turnaways • the total number of searches reported in a given month for an institution Database summary reports. These reports provide data on system usage at the database level: • the number of logons • the number of searches

	Some of the information available from the online statistics includes: Consortium Overview This report shows the total number of authorizations the consortium has assigned, the number of times users logged on, and the total number of searches conducted and the total number of full-text documents ordered over a one-month period. Institution Overview This report shows the maximum number of logons used, the average number of logons used and the total number of searches conducted over a one-month period. It also shows the total number of users who logged on FirstSearch over a one-month period. Institution Activity This report shows the number of times users logged in each database, the total number of searches conducted in each database and the percentage of searches conducted in each database. It also shows the average number of users logged into a particular database as well as the maximum number logged into a particular database at one time. Full-Text Activity This report shows, by database and as a total, the number of ASCII full-text documents that users viewed, e-mailed or printed over a one-month period. OCLC at present is in partial compliance with the ICOLC guidelines. We are planning to make appropriate changes to our statistical reports to become fully compliant.
OVID (Spring 2000)	OVID is in compliance with the following items in that they provide statistics by: • Each specific database of the provider • Each institutionally-defined set of IP addresses / locators to subnet level • Total consortium Note: Assuming that consortium members are assigned distinct group ID. In consortiums this is normally the case • Time period • Number of queries (Searches) categorized as appropriate for the vendor's information • Number of Menu Selections categorized as appropriate to the vendor's system Note: Assuming that appropriate data would be display record, view record, print record etc... • Number of sessions (Logins), if relevant, must be provided as a measure of simultaneous use Note: Yes, but not simultaneous use Number of turn-always, if relevant, as a contract limit (e.g., requests exceed simultaneous user limit) • Number of items examined by citations displayed • Number of items examined by full text displayed broken down by title, ISSN with title listed, or other title identifier as appropriate OVID is not in compliance with the following items: • Number of items examined by special data element passed by subscriber (e.g., account or ID number) Note: Not at this time in the statistics program but we do collect this information in the stats file if it is passed through as part of a jumpstart command
Primary Source Media (Fall 1999)	Primary Source Media can provide user statistics on a predefined or as-needed basis, utilizing the Webtrends software product for this purpose. Most of the guidelines developed by ICOLC are addressed by our statistical reporting capabilities.
Roth (Fall 1999)	We provide usage statistics at any given intervals for libraries (normally

	on a quarterly basis). Our reports conform to the International Coalition of Library Consortia guidelines.
Silver Platter (Spring 2000)	We provide statistics that are e-mailed on a monthly basis for usage. The usage statistics include the database used, time, # of logins and # of records retrieved.
SIRS (Spring 2000) SIRS (cont.)	SIRS Usage Statistics were originally constructed using the Guidelines for Statistical Measures of Usage of Web-Based Indexed, Abstracted and Full Text Resources developed by the International Coalition of Library Consortia (ICOLC). They comply with these guidelines. SIRS provides statistics on a monthly basis. They are e-mailed each month to a designated contact. The statistics include: SIRS Knowledge Source • total accesses to all databases • total sessions • total number of references viewed • total number of searches • total for each type of search • total accesses to almanac databases • total number of summaries/descriptors viewed • total number of sources viewed • total number of graphics viewed • total number of article e-mailed • total accesses to the Search History • total accesses to the Tagged List • total accesses to the Dictionary/Thesaurus • total accesses to the Help & Tips. SIRS Discoverer Deluxe • total accesses • total number of reference materials viewed • total number of searches • total number of searches by type of search • total number of full-text articles viewed • total number of World Almanac for Kids keyword searches • total number of World Almanac for Kids table of content searches • total number of encyclopedia searches • total number of Dictionary/Thesaurus searches • total number of sources/summaries viewed • total number of articles e-mailed • total number of charts viewed • total number of graphics viewed • total accesses to Workbooks
Softline (Spring 2000)	SLI's provision of usage statistics to subscribing libraries complies where appropriate with the ICOLC guidelines. SLI will provide libraries with usage statistics which include the following information : No. of sessions; No. of searches; No. of articles retrieved; No. of publications retrieved; Maximum no. of concurrent users; No. of times access is denied. Statistics will be distributed by e-mail to an address designated by the library, on a monthly or quarterly basis, as requested. SLI is also planning development of access to usage statistics via a website.
Standard & Poor's (Fall 1999)	We are currently creating user statistics that comply with internal requirements established by Standard & Poor's. Further review of the

	ICOLC is necessary to determine if our statistical reporting complies.
Teton Data Systems' STAT!Ref (Spring 2000)	Our intranet product which resides on your own web server within your environment has its own administration page that will provide reporting capabilities based on a specific date range. Users can obtain information on anyone who has been denied access.
H.W. Wilson (Spring 2000)	Statistical reporting complies in part with the guidelines developed by the International Coalition of Library Consortia. The current WilsonWeb report includes the name of the institution, number of searches and number of records downloaded, by database, for the current month, last month, and year-to-date. Reports can be produced by databases; by community of interest entity-defined IP addresses; by community of interest type and by total of all community of interest types; by special element passed by community of interest entity; and by time period. Presently the available reports are generated monthly by the company and provided to customers in hard-copy format or via e-mail upon request. We are also evaluating the most efficient manner by which to make the reports available in electronic format. WilsonWeb reports are in a continued state of development. We are using requirements of our customers as the basis for enhancements to the reporting functionality.
WorldBook (Fall 1999)	Currently we are not providing this information, however after the first of the year the company will begin to provide some data. Sorry at this time we are not sure what that data will be.

This data was collected by staff at the Washington State Library in Fall 1999 and Spring 2000, in conjunction with Statewide Database Trials. It was compiled from responses supplied by vendors and used as a handout at a program on Capturing and Using Statistics about Electronic Resources, presented at the Washington Library Association annual conference, May 17-19, 2000 in Tacoma, Washington.

If you have questions about this document, contact Jeanne Crisp at the Washington State Library, 360-704-5255 or jcrisp@statelib.wa.gov.

Appendix E. U. Pennsylvania Library Reports

Following pages contain sample reports obtained from U. Penn. Library.

What We Can Measure Regarding the Use of Library Databases

A matrix of licensed vendor databases in terms of the reported statistics.

Use of Licensed Databases, Measured in Attempted Log-Ons. November 1999-June 2000

The table shows the number of "attempted log-ons" recorded by user click-throughs on the library's database web site. The raw data are tracked by the originating IP (Internet) addresses and the totals are calculated for each school on campus, library buildings, and the modem pool.

Heavily- & Lesser-Used Databases, Measured in Attempted Log-Ons. November 1999-June 2000

This table that shows the most heavily used licensed databases by the number of attempted log-ons. The statistics are allocated to schools, library, and to the modem pool.

Demand for Licensed Resources. Attempted logons averaged by time of day, November 1999-June 2000

The graphs shows the intensity of licensed database use by time of day.

Demand for Licensed Resources. Hourly attempted logons averaged by Major Network Domains, November 1999-June 2000

The graphs shows the intensity of licensed database by location (where the requests were made) and by time of day.

What We Can Measure Regarding the Use of Library Databases

updated 7/2000

Database	Searches	Cnct Time	Log-ons	Docs viewed	Hits/Pages	Bytes sent	Client	Source	Ct*	new in 00 n
	Available Measures									
Amico Library	x						Web; Telnet	RLIN/Eureka	1	
Anthropological Literature	x						Web; Telnet	RLIN/Eureka	2	
Avery Index	x						Web; Telnet	RLIN/Eureka	3	
Bibliography of the History of Art	x						Web; Telnet	RLIN/Eureka	4	
Blackwell's Table of Contents	x						Web; Telnet	RLIN/Eureka	5	
Chicano Database	x						Web; Telnet	RLIN/Eureka	6	
ESTC	x						Web; Telnet	RLIN/Eureka	7	
Francis	x						Web; Telnet	RLIN/Eureka	8	
Hispanic American Periodicals Index	x						Web; Telnet	RLIN/Eureka	9	
History of Science and Technology	x						Web; Telnet	RLIN/Eureka	10	
Index to 19th Cent American Art Period	x						Web; Telnet	RLIN/Eureka	11	n
Inside Information Plus	x						Web; Telnet	RLIN/Eureka	12	n
RLIN Bib file	x						Web; Telnet	RLIN/Eureka	13	
World Law Index	x						Web; Telnet	RLIN/Eureka	14	n
Index to Foreign Legal Periodicals	x						Web; Telnet	RLIN/Eureka	15	n
Scipio	x						Web; Telnet	RLIN/Eureka	16	
PROMT		x	x				Web; Telnet	IAC	17	
Academic Index		x	x				Web; Telnet	IAC	18	
General Business File		x	x				Web; Telnet	IAC	19	
Social Sciences Citation Index	x	avrg	x				Web	ISI	20	
Science Citation Index	x	avrg	x				Web	ISI	21	
Arts & Humanities Citation Index	x	avrg	x				Web	ISI	22	
Journals @Ovid Full-text	x	x	x	x			Web; Telnet; Java	Ovid	23	
Sociological Abstracts remotely loaded -r	x	x	x	x			Web; Telnet; Java	Ovid	24	
PsycINFO & PsycInfo Hist. File	x	x	x	x			Web; Telnet; Java	Ovid	25	
MEDLINE	x	x	x	x			Web; Telnet; Java	Ovid	26	
INSPEC r	x	x	x	x			Web; Telnet; Java	Ovid	27	
Health & Psychosocial Instruments r	x	x	x	x			Web; Telnet; Java	Ovid	28	
HealthSTAR r	x	x	x	x			Web; Telnet; Java	Ovid	29	
ERIC r	x	x	x	x			Web; Telnet; Java	Ovid	30	
EconLit r	x	x	x	x			Web; Telnet; Java	Ovid	31	
CINAHL	x	x	x	x			Web; Telnet, Java	Ovid	32	
CancerLit	x	x	x	x			Web; Telnet; Java	Ovid	33	
CAB Abstracts r	x	x	x	x			Web; Telnet; Java	Ovid	34	
BIOSIS Previews	x	x	x	x			Web; Telnet; Java	Ovid	35	
BioethicsLine	x	x	x	x			Web; Telnet; Java	Ovid	36	
Art Index	x	x	x	x			Web; Telnet; Java	Ovid	37	
Applied Science & Technology	x	x	x	x			Web; Telnet; Java	Ovid	38	
AIDSLINE	x	x	x	x			Web; Telnet; Java	Ovid	39	
Agricola r	x	x	x	x			Web; Telnet; Java	Ovid	40	
Ageline r	x	x	x	x			Web; Telnet; Java	Ovid	41	
ABI/Inform	x	x	x	x			Web; Telnet; Java	Ovid	42	
Cochrane Database of Systemic Revs.	x	x	x	x			Web; Telnet; Java	Ovid	43	n
Best Evidence	x	x	x	x			Web; Telnet; Java	Ovid	44	n
World Cat	x		x				Web; Telnet	OCLC	45	
PAIS International	x	x	x	x			Web; Telnet; Java	OCLC	46	
RILM Abstracts of Music Literature	x	x	x	x			Web; Telnet; Java	OCLC	47	
MLA Int'lBibliography	x	x	x	x			Web; Telnet; Java	OCLC	48	
GeoRef	x		x				Web; Telnet	OCLC	49	
Books in Print	x		x				Web; Telnet	OCLC	50	
ATLA Religion Database	x		x				Web; Telnet	OCLC	51	
Philasophers Index		x	x				Web	SlvrPlatter	52	n
EI Compendex		x	x				Web	Engineering Info Inc	53	
EIU's Business Newsletter...		x	x				Web	SlvrPlatter	54	n
EIU Investing, Licensing and Trading	-	-	-	-	-	-	Web	Silverplatter	55	n
EIU Views		x	x				Web	SlvrPlatter	56	n
Intern'l Bibliography of the Social Scis.		x	x				Web	SlvrPlatter	57	n
International Political Science Absts.		x	x				Web	SlvrPlatter	58	n
LLBA Abstracts		x	x				Web	SlvrPlatter	59	
Social Work Abstracts		x	x				Web	SlvrPlatter	60	
OED	x						Web	Local	61	
Britannica	x				x		Web	BOL	62	
Beilstein via Crossfire			x				Win/MAC	Beilstein	63	
Academic Universe (Lexis/Nexis for the web)	x			x			Web	Reed/Elsv	64	
SciFinder Scholar		x					Win/MAC	Chem Abs	65	

Database	Searches	Cnct Time	Log-ons	Docs viewed	Hits/Pages	Bytes sent	Client	Source	Ct.	New in 99
	Available Measures									
Franklin (OPAC)	x						Web:Telnet	Local	----	
Ethnic Newswatch	x		x				Web	Softline Info	66	n
GenderWatch	x		x				Web	Softline Info	67	n
Periodicals Contents Index					x		Web	Chad.H	68	
Patrologia Latina					x		Web	Chad.H	69	
Literature Online					x		Web	Chad.H	70	
Int'l Index to Music Perdcls					x		Web	Chad.H	71	
African American Biographical Dbase					x		Web	Chad.H	72	n
Palmer Index to the London Times					x		Web	Chad.H	73	n
Historical Index to the NYTimes					x		Web	Chad.H	74	n
America: History and Life	-	-	x	-	-	-	Web	ABC-CLIO	75	n
Art Bibliographies Modern	-	-	x	-	-	-	Web	ABC-CLIO	76	n
Historical Abstracts	-	-	x	-	-	-	Web	ABC-CLIO	77	n
MathSciNet					x	x	Web	AMS	78	
Databases with no use measures										
ABI/Inform/proquest (ovid-count once)	-	-	-	-	-	-	web	Proquest		
ABSEES (Slavic & E. Eur. Stds)	-	-	-	-	-	-	Web; Telnet	AAASS	79	
Access UN	-	-	-	-	-	-	Web	Newsbank	80	
Access UNDB	-	-	-	-	-	-	Web	Newsbank	81	N
Accessible Archives	-	-	-	-	-	-	Web	AccArch	82	n
Anthropological Index *	-	-	-	-	-	-	Web	Free	83	
AP Photo Archive	-	-	-	-	-	-	Web	Accunet-AP	84	n
ARL Latin Americanist Research Resources	-	-	-	-	-	-	Web	ARL	85	n
ARTFL	-	-	-	-	-	-	Web	U Chicago	86	
BankScope	-	-	-	-	-	-	Web	Bureau Van Dijk	87	n
Bibliography of Asian Studies	-	-	-	-	-	-	Web	Assc Asian St	88	n
Business & Industry	-	-	-	-	-	-	Web	Rspnsv db	89	
CCH Commerce Clearinghouse Tax Res	-	-	-	-	-	-	Web	Commc Clearh	90	n
CIAO	-	-	-	-	-	-	Web	Columbia U	91	
CIOS/Comserv	-	-	-	-	-	-	Web	Comserv	92	n
CogNet	-	-	-	-	-	-	Web	MIT Press	93	N
Congressional Universe	-	-	-	-	-	-	Web	CIS	94	
Contemporary Women's Issues	-	-	-	-	-	-	Web	Rspnsv db	95	
Current Index to Statistics	-	-	-	-	-	-	Web	CIS	96	n
D&B Million Dollar Database	-	-	-	-	-	-	Web	Dun /Bradstreet	97	n
Declassifiedm Documents Online	-	-	-	-	-	-	Web	Gale	98	n
Dissertation Abstracts	-	-	-	-	-	-	Web	UMI	99	n
Dow Jones Interactive	-	-	-	-	-	-	Web	Dow Jones	100	
Early English Books Online	-	-	-	-	-	-	web	proquest	101	n
EdgarScan	-	-	-	-	-	-	web	free	102	n
EIU Country Commerce	-	-	-	-	-	-	web	Econist Intel Unit	103	N
EIU Investing, Licensing and Trading	-	-	-	-	-	-	Web	Silverplatter	104	n
Encyclopedia of Assns	-	-	-	-	-	-	Web	Gale	105	
Euromonitor's Global Market Information	-	-	-	-	-	-	Web	Euromarket PLC	106	n
Facts on File	-	-	-	-	-	-	Web		107	n
Gale Business Resources	-	-	-	-	-	-	Web	Gale	108	n
Gartner Intraweb	-	-	-	-	-	-	Web	Gartner grp	109	n
Global Access	-	-	-	-	-	-	Web	Disclosure	110	n
Grove Dictionary of Art Online	-	-	-	-	-	-	Web	Grove	111	n
Grover Dictionary of Opera	-	-	-	-	-	-	Web	Grove	112	n
Harp Week	-	-	-	-	-	-	Web	Harpweek	113	n
Hbook of Latin American Studies	-	-	-	-	-	-	Web	Free	114	
HISTLINE	-	-	-	-	-	-	Web	NLM	115	n
Hoover's Online	-	-	-	-	-	-	Web	Hoover's.com	116	n
eHRAF Collection of Archaeology	-	-	-	-	-	-	Web	Umich	117	n
eHRAF Collection of Ethnography	-	-	-	-	-	-	Web	Umich	118	n
ICM Online	-	-	-	-	-	-	Web	ICM Conferences	119	N

What We Can/Can't Measure Regarding the Use of Library Databases

Database	Available Measures Searches	Cnct Time	Log-ons	Docs viewed	Hits/Pages	Bytes sent	Client	Source	Ct.	New in 99
Index of Christian Art	-	-	-	-	-	-	Web	Princeton U	120	n
Index to Early American Periodicals	-	-	-	-	-	-	Web	Computer Index Sys	121	n
ISI Emerging Markets	-	-	-	-	-	-	Web	Intrn'l Securities	122	n
ITER:Gateway to the Renaissance	-	-	-	-	-	-	Web	Ren Soc,etal	123	n
Johns Hopkins Guide to Lit Theory	-	-	-	-	-	-	Web	JH U Press	124	
Knowledge at Wharton	-	-	-	-	-	-	Web		125	N
Mental Measurements Yearbook	-	-	-	-	-	-	Web	SlvrPlatter	126	n
Middle English Compendium	-	-	-	-	-	-	Web	UMICH	127	n
MITECS	-	-	-	-	-	-	Web	MIT	128	n
Monthly Catalog	-	-	-	-	-	-	Web; Telnet	Free	129	
Multex	-	-	-	-	-	-	Web		130	n
Music Index	-	-	-	-	-	-	Web	Harmony park	131	n
NBER Working Papers	-	-	-	-	-	-	Web		132	
NCJRS Abstracts Database	-	-	-	-	-	-	Web	Free	133	n
NetEC	-	-	-	-	-	-	Web	Free	134	n
Old English Corpus	-	-	-	-	-	-	Web	UMICH	135	n
Poiesis	-	-	-	-	-	-	Web	Phil doc centr	136	n
Polling the Nations	-	-	-	-	-	-	Web	ORS Publishing	137	n
Population Index (unrestricted)	-	-	-	-	-	-	Web	Free	138	
Pblctns & Broadcast Media	-	-	-	-	-	-	Web	Gale	139	
RAMBI	-	-	-	-	-	-	Web	Free	140	
Research Bank Web-Investext	-	-	-	-	-	-	Web	Investext	141	n
Russian Academy of Sciences Bibliography	-	-	-	-	-	-	Web	RAS	142	n
Social Science Electronic Data Library	-	-	-	-	-	-	Web	Sociometrics corp	143	n
Sports Business Research Network	-	-	-	-	-	-	Web	Sprt Bus RN	144	
State Capital Universe	-	-	-	-	-	-	Web	CIS	145	n
Statistical Universe	-	-	-	-	-	-	Web	CIS	146	n
STAT-USA/Internet	-	-	-	-	-	-	Web	Dpt of Comm	147	n
Table Base	-	-	-	-	-	-	Web	Rspnsv db	148	
Times Literary Supplement	-	-	-	-	-	-	Web	London Times	149	n
United Nations Treaty Collection	-	-	-	-	-	-	Web	UN	150	n
Women Writers Online	-	-	-	-	-	-	Web	Brown Univ	151	n

E-Journal Collections	Available Measures Se	Cn	Lo	Do	Hi	By	Client	Source	Ct.	
ACS Journals	x			x			Web			
JSTOR	x			x	x		Web			
Johns Hopkins Univ Press					x		Web			
Elec. Collections Online: Journals	x		x	x			Web			
Academic Ideal							Web			
American Institute of Physics							Web			
American Mathematical Society							Web			
Annual Reviews							Web			
Link (Medicine)							Web			
IEEE	-	-	-	-	-	-	Web			
Elsevier Scientific	-	-	-	-	-	-	Web			
Cambridge Scientific	-	-	-	-	-	-	Web			
Springer	-	-	-	-	-	-	Web			
Wiley	-	-	-	-	-	-	Web			

University of Pennsylvania Library

[illegible]
8/14/00

Use of Licensed Databases, Measured in Attempted Log-Ons. November 1999 - June 2000

School and Other Domains on the Campus Network →

File ↓	In-Library	Modem Pool	MED	ResNet	WHRTN	SAS	ASC	Univ Admn	SEAS	VET	NURS	DENTL	GSFA	SSW	LAW	GSE	Total On-Campus	Off-Campus	Row Total
MEDLINE	24,646	10,510	46,971	3,540	340	3,610	3,981	621	1,623	3,764	1,438	1,401	12	43	93	21	102,614	16,946	119,560
LEXIS/NEXIS	6,761	7,692	619	7,844	3,998	1,539	2,002	819	361	58	52	48	297	144	262	96	32,592	9,007	41,599
Academic Index	9,893	5,542	379	7,606	805	2,233	1,826	605	182	12	109	6	229	485	183	73	30,168	3,968	34,136
ISI Citation Indexes	4,664	2,453	5,768	1,122	856	3,978	1,316	570	1,879	581	71	165	48	43	55	64	23,633	3,683	27,316
Dow Jones	4,239	5,186	569	3,313	3,750	810	769	850	153	24	7	10	18	10	26	7	19,741	5,564	25,305
ABI/Inform	5,359	3,314	357	3,421	4,988	532	691	220	253	42	23	22	35	24	85	4	19,370	4,568	23,938
PsycINFO	4,139	2,276	1,300	1,467	240	1,122	997	532	23	12	160	4	17	175	53	238	12,755	2,646	15,401
Journals@OVID Full text	2,993	1,594	3,749	1,072	128	511	527	169	273	199	519	68	1	8	23	5	11,839	3,118	14,957
Business & Industry	2,570	1,757	81	1,720	1,611	225	400	95	155	3	19	3	7	3	22	3	8,674	3,015	11,689
MLA International	4,619	1,590	67	1,660	24	900	194	184	10	0	4	4	7	0	9	19	9,291	878	10,169
CINAHL/Nursing	3,125	1,154	928	878	6	81	330	47	7	1	956	0	1	1	0	0	7,515	1,669	9,184
Investext	823	1,781	20	703	1,625	162	160	53	179	0	0	0	2	0	6	0	5,514	3,054	8,568
PubMed	1,824	431	1,868	166	9	253	339	53	143	251	25	34	0	3	1	0	5,400	1,117	6,517
ERIC	2,184	862	149	556	55	282	190	224	10	1	31	9	8	32	5	476	5,074	1,208	6,282
EconLit	893	757	71	446	1,310	966	116	93	17	1	7	1	15	13	26	7	4,739	623	5,362
Hoovers Online	839	912	14	682	809	83	160	54	101	0	0	2	2	0	4	0	3,662	1,207	4,869
Sociological Abs	1,098	702	110	475	136	455	206	127	13	2	38	5	5	66	12	23	3,473	593	4,066
Multex	651	673	3	345	902	86	90	18	27	0	0	0	2	0	1	0	2,796	1,185	3,981
CAB Abstracts	828	215	82	49	6	86	27	32	13	1,914	1	2	3	0	1	0	3,259	304	3,563
TableBase	828	564	11	248	540	35	75	50	84	0	0	0	4	0	5	0	2,452	1,038	3,490
Dissertations	827	558	162	232	49	275	160	78	71	8	30	1	13	39	26	34	2,563	836	3,399
INSPEC	411	198	218	120	27	756	102	87	650	3	0	4	3	0	0	1	2,580	644	3,224
Art Index	1,670	326	22	403	27	78	54	54	5	4	1	1	125	0	5	1	2,776	413	3,189
BIOSIS Prev	821	256	418	103	7	565	95	55	20	101	5	4	1	0	0	0	2,611	478	3,089
D&B Million $ Directory	486	370	27	230	353	131	117	354	21	2	1	3	6	0	12	0	2,113	924	3,037
Anthropological Literature	1,001	413	99	346	28	451	88	45	3	2	13	0	1	4	5	7	2,506	441	2,947
Avery Index	1,227	312	2	150	8	64	40	38	1	0	0	0	612	0	1	0	2,455	457	2,912
Global Access	500	427	11	274	578	43	61	48	46	0	0	3	3	0	0	0	1,994	458	2,452
General BusinessFile	367	276	22	386	414	38	70	37	22	1	2	1	1	0	15	1	1,653	642	2,295
PAIS International	900	304	22	428	83	97	61	32	13	2	5	0	22	4	16	2	1,991	272	2,263
HealthSTAR	592	304	192	245	131	58	92	47	17	1	40	2	2	5	3	1	1,732	487	2,219
Am History and Life	733	269	24	276	28	203	82	50	3	0	1	0	6	11	6	1	1,693	462	2,155
Statistical Universe	440	279	24	315	288	58	59	35	51	5	3	0	8	5	11	0	1,581	506	2,087
Literature Online	439	309	29	470	37	73	74	32	7	1	2	0	4	1	1	8	1,487	537	2,024
Bib History Art	907	237	18	207	23	122	36	61	4	2	0	2	7	1	6	0	1,633	277	1,910
Books in Print	350	353	58	80	73	306	171	57	6	9	9	6	4	4	9	8	1,503	355	1,858
Applied Science & Tech Index	364	100	106	106	37	35	71	85	341	20	2	8	18	0	1	0	1,294	509	1,803
Euromonitor	427	278	8	184	268	45	64	28	12	0	1	0	10	0	2	0	1,327	461	1,788
STATUSA	319	232	14	201	251	42	60	32	34	3	1	0	4	1	4	3	1,201	574	1,775
Gale Business Resources	275	193	31	207	245	21	61	47	24	2	1	3	1	0	7	0	1,118	586	1,704
ATLA Religion	559	231	27	213	22	99	29	49	8	2	1	1	1	21	6	5	1,274	388	1,662
Bioethics	483	151	205	190	10	41	65	50	8	0	19	7	1	0	4	0	1,234	418	1,652
Accessible Archives	396	131	25	157	19	92	66	50	8	1	2	2	7	0	1	2	959	652	1,611

School and Other Domains on the Campus Network →

File	In-Library	Modem Pool	MED	ResNet	WHRTN	SAS	ASC	Univ Admn	SEAS	VET	NURS	DENTL	GSFA	SSW	LAW	GSE	Total On-Campus	Off-Campus	Row Total
S&P Industry Surveys	210	218	12	122	262	17	53	21	36	0	0	0	0	0	4	0	955	644	1,599
BankScope	50	21	7	4	11	22	22	2	2	2	1	1	1	0	1	0	147	1,428	1,575
Social Work Abstracts	489	189	36	202	7	31	30	60	0	2	13	2	1	153	5	6	1,226	338	1,564
Congressional Un	366	150	26	167	11	156	23	33	4	1	6	2	2	66	23	1	1,037	488	1,525
Historical Abstracts	571	205	10	182	18	138	41	35	5	0	5	2	5	6	6	2	1,231	277	1,508
AGRICOLA	408	94	121	75	7	90	28	76	24	276	2	3	3	0	0	0	1,207	299	1,506
Anthropological Index	394	163	46	219	14	93	67	29	8	4	6	0	2	3	5	3	1,056	341	1,397
Current Index to Statistics	197	148	99	128	222	23	25	30	25	4	2	0	1	2	6	2	914	413	1,327
Periodical Contents Index	563	130	48	161	12	70	26	76	4	4	0	0	5	1	3	3	1,106	199	1,305
History of SciTech	278	169	54	110	12	176	49	27	7	2	3	0	2	1	6	2	898	358	1,256
Ling Lang & Behavior Abstracts	332	222	8	121	10	153	28	119	5	1	0	2	0	0	0	26	1,027	128	1,155
Philosopher Index	401	142	25	147	15	151	16	28	3	0	1	0	5	0	19	0	953	194	1,147
ISI Emerging Mkt	277	168	22	133	146	44	25	27	12	3	0	0	5	0	6	0	868	253	1,121
SciFinder	203	74	139	37	15	172	48	43	146	3	2	2	0	0	0	0	884	233	1,117
AIDSLINE	352	78	158	72	9	35	41	34	5	15	30	10	2	7	0	0	848	258	1,106
Cont Womens Issues	377	182	18	204	26	36	32	28	2	0	13	0	0	4	7	3	932	165	1,097
EIU ViewsWire	371	159	3	114	157	27	17	18	11	0	1	0	2	1	1	0	882	208	1,090
Cancer Lit	229	78	197	37	6	29	33	40	2	15	44	0	0	3	2	2	717	349	1,066
Bib Asian Studies	487	147	7	135	11	64	39	22	3	1	1	0	3	2	1	0	923	140	1,063
Francis	373	183	11	130	18	99	23	26	0	0	3	0	1	3	6	3	879	148	1,027
MathSciNet	259	74	67	55	58	87	20	50	69	8	0	2	1	0	0	1	751	266	1,017
PROMT	277	186	6	76	108	14	32	23	13	0	0	0	1	0	2	0	738	278	1,016
Ageline	379	71	59	92	8	17	51	37	1	1	70	0	0	10	2	0	798	212	1,010
NY Times Index	234	78	26	209	38	33	31	45	5	2	3	0	0	2	5	1	712	288	1,000
AP Photo	127	85	30	199	42	32	67	36	10	12	3	2	24	2	5	0	676	311	987
Declassified Doc	119	21	19	40	7	22	24	17	41	3	3	3	0	169	4	1	493	457	950
GeoRef	267	61	9	57	6	271	7	23	19	31	2	1	9	0	0	1	764	154	918
EI Compendex	253	40	35	34	16	13	39	74	190	0	0	0	2	1	0	0	697	210	907
Health & PsychSocial Instruments	259	106	79	95	6	17	29	41	2	4	32	0	0	4	4	1	679	175	854
Gender Watch	220	127	19	174	10	14	37	30	7	1	2	2	0	4	2	2	651	153	804
RILM Abstracts	346	121	0	74	1	81	7	17	0	0	2	0	0	0	0	0	649	77	726
Inter Pol Sci Abstracts	284	90	5	130	11	41	25	30	3	1	0	0	3	1	9	0	633	90	723
EIU Business	161	103	6	93	107	16	15	28	8	0	0	0	2	0	2	0	541	179	720
Cochrane	180	67	118	16	2	13	18	24	4	0	63	1	0	3	0	14	523	169	692
Ethnic News	221	82	5	134	17	14	27	25	4	1	3	1	0	1	6	2	543	138	681
Access UN	236	48	10	103	11	22	24	31	6	1	1	0	3	0	11	1	508	167	675
Music Index	232	53	11	115	8	21	16	20	4	1	0	0	0	0	0	1	482	184	666
African Am Biogs	175	47	27	76	14	23	23	38	1	1	1	1	0	9	3	3	442	220	662
Best Evidence	170	54	102	26	4	12	19	25	3	0	10	3	0	0	4	0	432	178	610
Grove Dictionary	172	54	21	70	5	34	14	33	7	0	0	0	1	1	0	1	413	197	610
Facts on File	106	56	9	104	35	29	21	29	2	0	2	1	1	1	2	3	401	142	543
Blackwell	147	124	27	35	5	47	21	27	3	2	0	0	2	0	12	2	454	83	537
NBER Working Papers	102	67	8	46	91	17	13	23	8	0	0	0	4	0	8	2	389	145	534
Beilstein	128	34	52	31	1	89	21	27	11	1	2	2	0	0	0	0	399	123	522
Sports Business	93	63	3	54	38	11	43	20	2	2	0	0	1	0	1	0	331	173	504
HRAF - Ethnography	111	53	6	80	21	46	38	40	1	0	6	5	0	1	1	1	410	87	497

School and Other Domains on the Campus Network →

File	In-Library	Modem Pool	MED	ResNet	WHRTN	SAS	ASC	Unv Admn	SEAS	VET	NURS	DENTL	GSFA	SSW	LAW	GSE	Total On-Campus	Off-Campus	Row Total
Women Writers	104	54	6	76	2	9	16	22	2	0	1	0	0	1	4	2	299	180	479
ARTBibliographies	204	48	6	72	3	14	10	18	0	1	0	0	6	0	2	0	384	94	478
ABSEES	136	70	9	50	6	10	5	27	3	3	0	0	1	0	13	1	334	131	465
HistLine	82	63	75	41	1	28	22	21	4	0	2	0	0	0	1	0	340	125	465
Hispanic Amer Periodicals	178	52	3	59	8	23	6	26	1	0	4	0	2	1	1	1	365	76	441
Edgar SEC Reports	34	13	9	8	20	4	28	2	0	0	2	0	1	0	0	0	121	310	431
EIU IL&T	106	75	2	46	43	6	11	22	3	0	0	0	0	0	1	0	315	99	414
CIAO	137	58	2	84	12	20	10	25	1	0	2	0	1	0	0	1	353	55	408
RAMBI (Jewish Studies)	131	35	3	45	5	49	26	14	1	0	0	0	0	2	0	2	313	89	402
Polling the Nation	81	38	11	69	8	34	27	20	1	1	0	1	2	1	1	1	296	98	394
Inter Index Music Periodicals	141	31	2	98	3	13	4	19	5	0	1	0	0	2	2	0	321	58	379
ARL Latin Americanist	88	20	3	57	9	18	9	22	0	0	1	0	0	0	1	0	228	135	363
CIOS	51	26	2	35	1	5	116	21	1	0	1	0	1	1	2	0	263	99	362
Patrologia Latina	79	18	0	14	3	67	5	20	0	0	0	0	0	1	0	0	207	147	354
Mental Measurements	84	40	31	23	1	10	14	23	2	4	4	1	0	2	0	12	251	102	353
Gartner IntraWeb	28	19	5	3	11	7	18	1	0	0	1	0	0	0	1	0	94	244	338
CCH Tax Research	77	79	1	12	27	2	9	24	0	0	0	1	0	0	8	0	240	88	328
Population Index	51	20	3	23	16	33	9	20	3	0	0	0	3	0	0	0	181	147	328
Latin Americanist Research	66	37	5	64	11	8	7	21	1	0	0	0	2	0	1	1	224	89	313
ARTFL	56	41	1	25	2	26	8	25	1	0	3	0	1	0	0	0	189	121	310
Hdbk Latin Am Studies	91	27	3	47	10	11	1	23	1	0	0	0	1	0	0	0	215	94	309
Early English Books	70	21	2	11	4	46	13	12	0	0	0	0	0	0	0	0	179	101	280
Index to Early Amer Periodicals	61	17	7	30	1	21	9	14	1	0	1	0	1	1	1	0	165	106	271
London Times	65	6	6	41	10	9	4	36	3	0	0	0	1	0	0	0	181	88	269
AMICO	58	10	4	32	6	5	10	32	1	1	0	0	0	0	0	0	159	85	244
HRAF - Archaeology	53	17	0	15	4	7	9	38	0	0	0	1	2	0	0	0	146	79	225
Middle English Compendium	25	24	20	38	2	34	5	17	0	0	0	0	0	0	0	0	165	59	224
Old English Corpus	34	13	5	7	3	11	10	16	7	1	0	0	1	0	0	0	108	103	211
Harpers Weekly	79	4	4	19	1	8	7	19	1	1	0	0	1	1	0	1	146	64	210
Chicano	42	18	1	36	7	11	4	21	1	1	0	0	0	0	0	1	143	66	209
Monthly Catalog	46	10	3	18	3	5	8	21	1	0	0	0	0	0	10	0	125	80	205
Poiesis	50	17	3	35	3	4	6	17	1	0	0	0	0	0	0	0	136	46	182
Times (London)	37	13	4	24	5	5	7	15	1	1	0	0	0	0	0	0	112	69	181
State Capital Universe	52	12	4	15	0	10	3	20	0	1	0	0	0	0	2	0	119	48	167
NCJRS Abstract	28	7	0	14	0	3	2	18	0	1	0	0	0	5	0	0	78	88	166
ITER Gateway to Renaissance	28	17	0	6	0	26	7	21	1	0	0	1	0	0	0	0	107	43	150
Index to Foreign Legal Periodicals	24	13	6	17	3	1	1	20	1	0	0	0	0	0	11	0	97	39	136
Inside Information	15	13	4	14	9	2	3	21	2	1	0	1	1	0	1	0	87	46	133
MIT Ency of Cognition	31	17	3	11	2	4	3	12	1	1	0	2	0	0	0	0	87	41	128
World Law	14	5	2	17	6	2	3	17	2	0	0	0	1	1	1	1	72	48	120
Index Christian Art	24	5	2	7	2	2	4	18	0	1	1	0	1	0	0	0	67	52	119
Index 19th Cent Am Art Periodicals	28	12	2	12	0	4	5	19	1	0	0	0	1	0	0	0	84	31	115
Russian Sci Bib	15	9	4	5	3	3	4	17	0	1	0	1	0	0	0	0	62	37	99
SCIPIO	12	8	1	4	1	2	5	17	0	1	0	0	1	0	0	0	52	47	99
Column Total	112,552 23.0%	62,507 12.8%	66,955 13.7%	49,013 10.0%	27,080 5.5%	24,926 5.1%	18,015 3.7%	9,336 1.9%	7,664 1.6%	7,540 1.5%	3,961 0.8%	1,889 0.4%	1,699 0.3%	1,636 0.3%	1,311 0.3%	1,224 0.2%	397,248 81.0%	92,927 19.0%	490,175 100%

Heavily- & Lesser-Used Databases, Measured in Attempted Log-Ons. November 1999 - June 2000

School and Other Domains on the Campus Network →

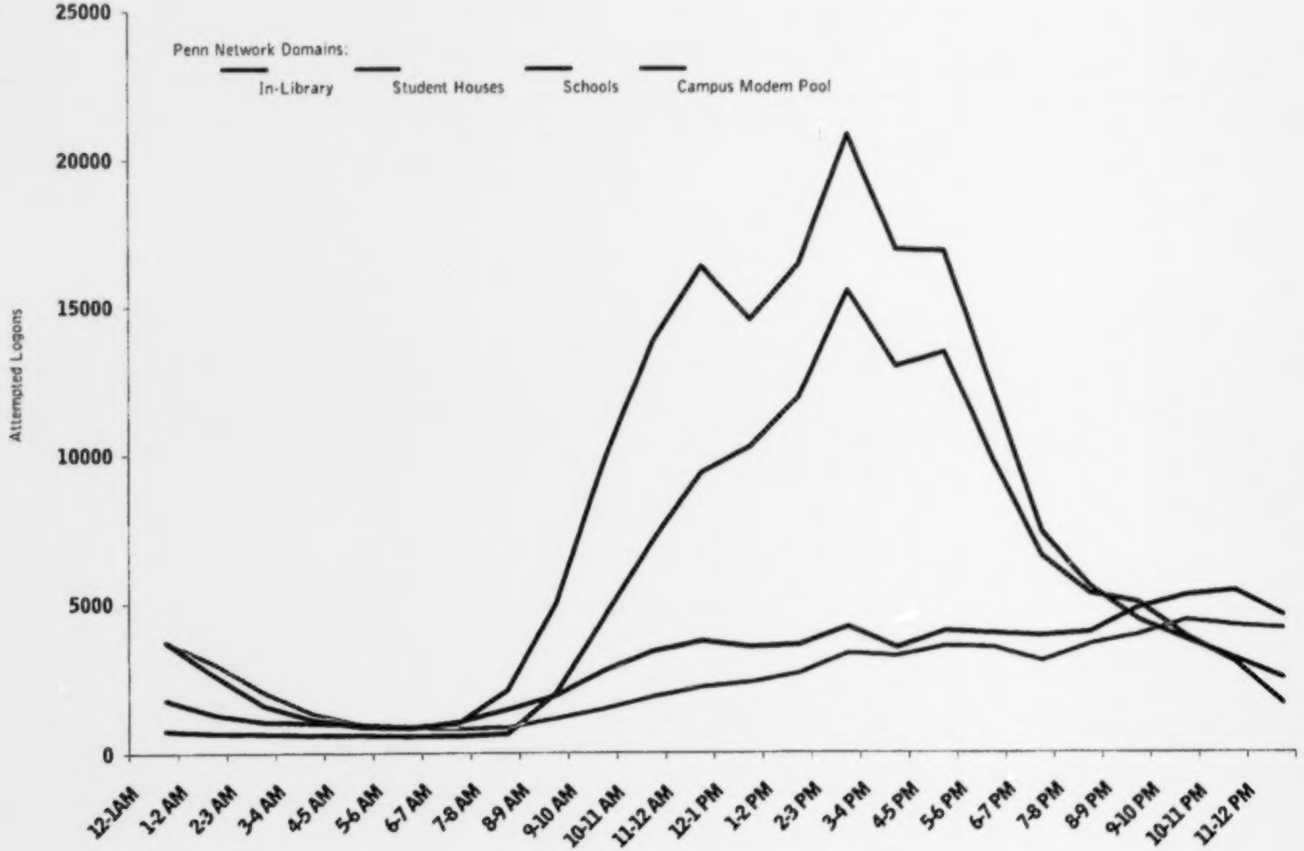
File	In-Library	Modem Pool	MED	ResNet	WHRTN	SAS	ASC	Unv Admn	SEAS	VET	NURS	DENTL	GSFA	SSW	LAW	GSE	Total On-Campus	Off-Campus	Row Total
MEDLINE	24,646	10,510	46,971	3,540	340	3,610	3,981	621	1,623	3,764	1,438	1,401	12	43	93	21	102,614	16,946	119,560
LEXIS/NEXIS	6,761	7,692	619	7,844	3,998	1,539	2,002	819	361	58	52	48	297	144	262	96	32,592	9,007	41,599
Academic Index	9,893	5,542	379	7,606	805	2,233	1,826	605	182	12	109	6	229	485	183	73	30,168	3,968	34,136
ISI Citation Indexes	4,664	2,453	5,768	1,122	856	3,978	1,316	570	1,879	581	71	165	48	43	55	64	23,633	3,683	27,316
Dow Jones	4,239	5,186	569	3,313	3,750	810	769	850	153	24	7	10	18	10	26	7	19,741	5,564	25,305
ABI/Inform	5,359	3,314	357	3,421	4,988	532	691	220	253	42	23	22	35	24	85	4	19,370	4,568	23,938
PsycINFO	4,139	2,276	1,300	1,467	240	1,122	997	532	23	12	160	4	17	175	53	238	12,755	2,646	15,401
Journals@OVID Full text	2,993	1,594	3,749	1,072	128	511	527	169	273	199	519	68	1	8	23	5	11,839	3,118	14,957
Business & Industry	2,570	1,757	81	1,720	1,611	225	400	95	155	3	19	3	7	3	22	3	8,674	3,015	11,689
MLA International	4,619	1,590	67	1,660	24	900	194	184	10	0	4	4	7	0	9	19	9,291	878	10,169
CINAHL/Nursing	3,125	1,154	928	878	6	81	330	47	7	1	956	0	1	1	0	0	7,515	1,669	9,184
Investext	823	1,781	20	703	1,625	162	160	53	179	0	0	0	2	0	6	0	5,514	3,054	8,568
PubMed	1,824	431	1,868	166	9	253	339	53	143	251	25	34	0	3	1	0	5,400	1,117	6,517
ERIC	2,184	862	149	556	55	282	190	224	10	1	31	9	8	32	5	476	5,074	1,208	6,282
EconLit	893	757	71	446	1,310	966	116	93	17	1	7	1	15	13	26	7	4,739	623	5,362
Hoovers Online	839	912	14	682	809	83	160	54	101	0	0	2	2	0	4	0	3,662	1,207	4,869
Sociological Abs	1,098	702	110	475	136	455	206	127	13	2	38	5	5	66	12	23	3,473	593	4,066
Multex	651	671	3	345	902	86	90	18	27	0	0	0	2	0	1	0	2,796	1,185	3,981
CAB Abstracts	828	215	82	49	6	86	27	32	13	1,914	1	2	3	0	1	0	3,259	304	3,563
TableBase	828	564	11	248	540	35	75	58	84	0	0	0	4	0	5	0	2,452	1,038	3,490
Total Top-20	82,976	49,963	63,116	37,313	22,138	17,949	14,396	5,424	5,506	6,865	3,460	1,784	713	1,050	872	1,036	314,561	65,391	379,952
Pecent of Total [133]	16.9%	10.2%	12.9%	7.6%	4.5%	3.7%	2.9%	1.1%	1.1%	1.4%	0.7%	0.4%	0.1%	0.2%	0.2%	0.2%	64.2%	13.3%	77.5%
AMICO	58	10	4	32	6	5	10	32	1	1	0	0	0	0	0	0	159	85	244
HRAF - Archaeology	53	17	0	15	4	7	9	38	0	0	0	1	2	0	0	0	146	79	225
Middle English Compendium	25	24	20	38	2	34	5	17	0	0	0	0	0	0	0	0	165	59	224
Old English Corpus	34	13	5	7	3	11	10	16	7	1	0	0	1	0	0	0	108	103	211
Harpers Weekly	79	4	4	19	1	8	7	19	1	1	0	0	1	1	0	1	146	64	210
Chicano	42	18	1	36	7	11	4	21	1	1	0	0	0	0	0	1	143	66	209
Monthly Catalog	46	10	3	18	3	5	8	21	1	0	0	0	0	0	10	0	125	80	205
Poiesis	50	17	3	35	3	4	6	17	1	0	0	0	0	0	0	0	136	46	182
Times (London)	37	13	4	24	5	5	7	15	1	1	0	0	0	0	0	0	112	69	181
State Capital Universe	52	12	4	15	0	10	3	20	0	1	0	0	0	0	2	0	119	48	167
NCJRS Abstract	28	7	0	14	0	3	2	18	0	1	0	0	0	5	0	0	78	88	166
ITER Gateway to Renaissance	28	17	0	6	0	26	7	21	1	0	0	1	0	0	0	0	107	43	150
Index to Foreign Legal Per.s	24	13	6	17	3	1	1	20	1	0	0	0	0	0	11	0	97	39	136
Inside Information	15	13	4	14	9	2	3	21	2	1	0	1	1	0	1	0	87	46	133
MIT Ency of Cognition	31	17	3	11	2	4	3	12	1	1	0	2	0	0	0	0	87	41	128
World Law	14	5	2	17	6	2	3	17	2	0	0	0	1	1	1	1	72	48	120
Index Christian Art	24	5	2	7	2	2	4	18	0	1	1	0	1	0	0	0	67	52	119
Index 19th C. Am Art Per.s	28	12	2	12	0	4	5	19	1	0	0	0	1	0	0	0	84	31	115
Russian Sci Bib	15	9	4	5	3	3	4	17	0	1	0	1	0	0	0	0	62	37	99
SCIPIO	12	8	1	4	1	2	5	17	0	1	0	0	1	0	0	0	52	42	94
Total Bottom-20	695	244	72	346	60	149	106	396	21	12	1	6	9	7	25	3	2,152	1,166	3,318
Percent of total [133]	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.2%	0.7%
Total All Files [133]	**112,552**	**62,507**	**66,955**	**49,013**	**27,080**	**24,926**	**18,015**	**9,336**	**7,664**	**7,540**	**3,961**	**1,889**	**1,699**	**1,626**	**1,261**	**1,224**	**397,248**	**92,927**	**490,175**

BEST COPY AVAILABLE

University of Pennsylvania Library

schools/ctuTime00
8/18/00

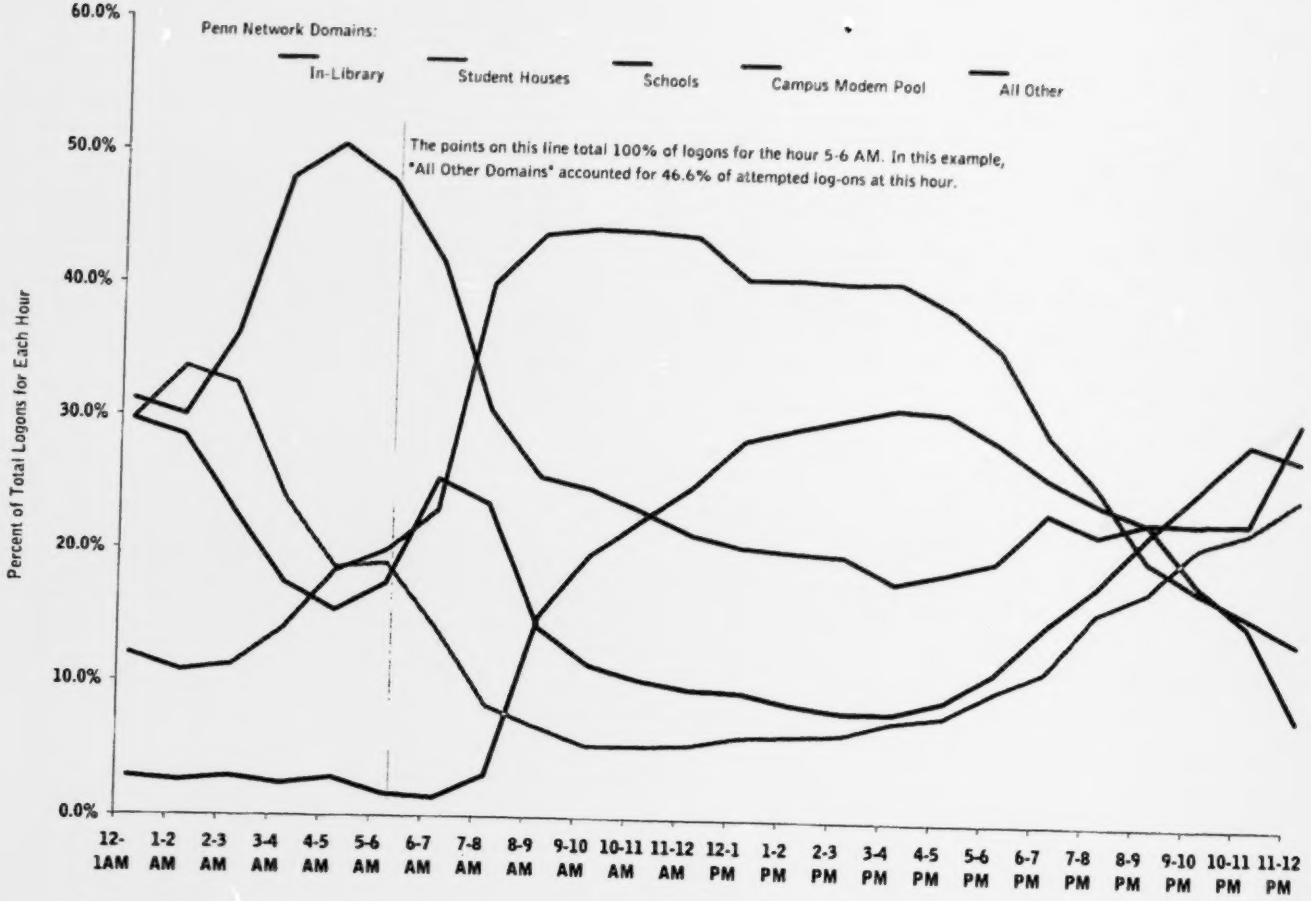
Demand for Licensed Resources. Attempted logons averaged by time of day, November 1999-June 2000



University of Pennsylvania Library

schools/ctuTime00
8/18/00

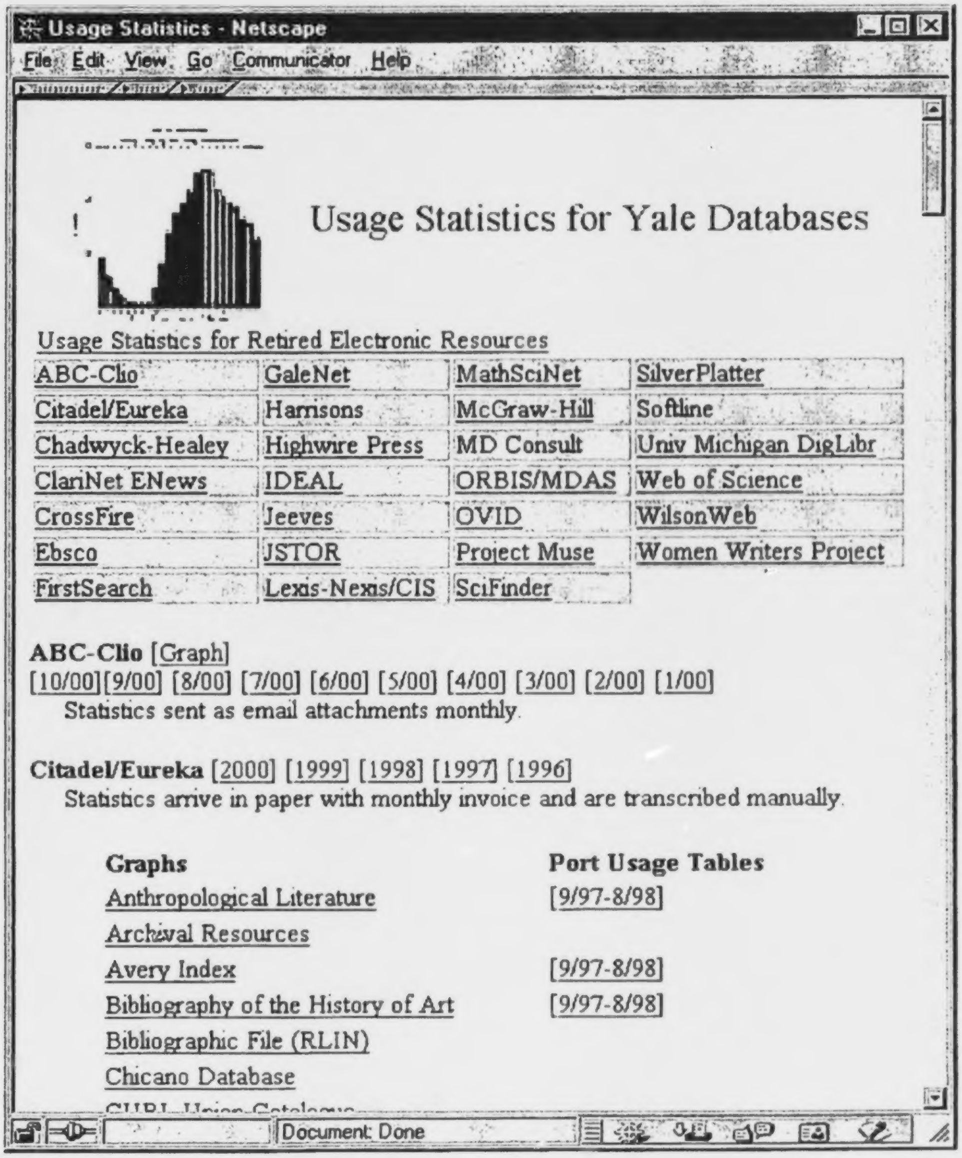
Demand for Licensed Resources. Hourly Attempted logons by Major Network Domains, November 1999-June 2000



Appendix F

Yale Library's Database Usage Statistics Webpage

The screen image below shows the initial page of the central usage statistics webpage maintained for internal use. Vendor supplied statistics are accompanied with a description of report delivery and graphs showing usage trend over time.



Usage Statistics for Yale Databases

Usage Statistics for Retired Electronic Resources

- ABC-Clio
- Citadel/Eureka
- Chadwyck-Healey
- ClariNet ENews
- CrossFire
- Ebsco
- FirstSearch
- GaleNet
- Harrisons
- Highwire Press
- IDEAL
- Jeeves
- JSTOR
- Lexis-Nexis/CIS
- MathSciNet
- McGraw-Hill
- MD Consult
- ORBIS/MDAS
- OVID
- Project Muse
- SciFinder
- SilverPlatter
- Softline
- Univ Michigan DigLibr
- Web of Science
- WilsonWeb
- Women Writers Project

ABC-Clio [Graph]
[10/00][9/00] [8/00] [7/00] [6/00] [5/00] [4/00] [3/00] [2/00] [1/00]
Statistics sent as email attachments monthly.

Citadel/Eureka [2000] [1999] [1998] [1997] [1996]
Statistics arrive in paper with monthly invoice and are transcribed manually.

Graphs	Port Usage Tables
Anthropological Literature	[9/97-8/98]
Archival Resources	
Avery Index	[9/97-8/98]
Bibliography of the History of Art	[9/97-8/98]
Bibliographic File (RLIN)	
Chicano Database	

Appendix G

Responses to the Organizational Structure Question

The following question was sent to the project participants early October. Twelve responses were collected and presented below.

What kind of (official/ad hoc) organizational structure do you have right now to coordinate the collection and analysis of data about electronic resource use? Please list the titles of key personnel involved and their roles.

Titles of staff members	Duties / roles
Collection Development Team 1) Electronic Resources Coordinator 2) Collection Development Coordinators for Humanities, Social Sciences, and Science (3 people) 3) A team leader	1) Coordinating, selecting, licensing, and implementing e-resources. Also, compiling usage data, creating reports, and disseminating information selectors, and other stakeholders. 2) Coordinating content issues.
1) A serials acquisitions librarian 2) A systems librarian 3) The Assistant Dean for collection development	1) Reviewing and signing licenses and often receiving usage data. 2) Reviewing and installing software designed to capture the data.
1) Coordinator	1) Coordinating data collection and analyzing data.
Fiscal Services & Data Team	- Tracking their acquisitions expenditures and the cost of their e-resources. - Analyzing the data - Generating reports and reporting templates.
Networked Services Team 1) Networked services librarian 2) Acquisitions librarian 3) Principal bibliographer 4) Two rotating members 5) Graduate Student majoring in statistics	2) Negotiating licenses 5) Compiling usage information for the team to review in making renewal decisions.
1) Head, Business Administration 2) A policy quadrant (?) 3) Bibliographers in collections development	2) Coordinating web use data. 3) Collecting and analyzing the data.
1) NETDOC (NETworked Databases on Campus) Programmer 2) NETDOC Developer 3) Head of Serials Acquisitions 4) Reference Librarians	1, 2, 3, and 4) Involving in data collecting and analyzing the statistics.
1) Coordinator for Electronic Resources 2) Coordinator for Collection Management 3) Head of Acquisitions 4) Graduate Assistants	1, 2 and 3) Coordinating the collection and analysis of data about electronic resources and assisting the manager of Library in data analysis. 4) Compiling the available usage statistics and

Titles of staff members	Duties / roles
5) Manager, MIS	working with staff to make renewal decisions 5) Working with all of the above to assist in data analysis.
- User Needs Assessment Committee and Associate Director for Assessment	- Supporting the assessment activities of the organization and clarifying traditional measures as well as developing new measures
1) Associate Director 2) Coordinator 3) Database Administrator	
1) Director for collection Management 2) Dean of library 3) Director for instruction 4) Director for Reference Services 5) Director for Technical Services 6) Web Team 7) College Librarians	7) Liaison to colleges with instruction and collection management responsibilities
1) Electronic Publishing and Collections Librarian (Past) 2) Digital Collections Specialist (Present) 3) Reference Librarians 4) Student assistants	1) Collating and process and make available all stats 2) Reporting all available stats to Electronic publishing and Collections Librarian 3) Coordinating Medical library statistics. 4) Processing all statistics
Department chairs for Automated Systems and Collection Management coordinate and analyze electronic resource use data	Coordinate and analyze electronic resource use data
1) Coordinator for Electronic Resources 2) Computer Applications Specialist 3) Web Services Librarian	1) Coordinates the collection of vendor-produced statistics, decides what statistics to record and format for Web delivery 2) Supervises a student who does the data entry 3) Coordinates other statistics gathering such as log analysis and click through counting

ASSOCIATION OF RESEARCH LIBRARIES
WASHINGTON, D.C.
2002

MEASURES FOR ELECTRONIC RESOURCES (E-METRICS)

PART 2

Information Use Management and Policy Institute

MEASURES AND STATISTICS FOR RESEARCH LIBRARY NETWORKED SERVICES: PROCEDURES AND ISSUES

ARL E-METRICS PHASE II REPORT

Wonsik "Jeff" Shim, Assistant Professor
<wshim@lis.fsu.edu>

Charles R. McClure, Francis Eppes Professor, and Director
<cmcclure@lis.fsu.edu>

Bruce T. Fraser, Assistant Director
<bfraser@lis.fsu.edu>

John Carlo Bertot, Associate Professor, and Associate Director
<jcbertot@lis.fsu.edu>

Arif Dagli, Research Associate

Emily H. Leahy, Research Associate

With the Assistance of:

Don L. Latham, Assistant Dean and Senior Research Associate
Benjamin Keith Belton, Assistant Professor and Senior Research Associate
Linda Carruth, Research Associate

October 2001

Information Use Management and Policy Institute
School of Information Studies
Florida State University
Tallahassee, Florida 32306-2100
www.ii.fsu.edu

Association of Research Libraries
21 Dupont Circle, NW, Suite 800
Washington, D.C. 20036
www.arl.org

ASSOCIATION OF RESEARCH LIBRARIES
WASHINGTON, DC

Copyright © 2001 Association of Research Libraries

To order more copies of this report, contact

ARL Publications Distribution Center
P.O. Box 531
Annapolis Junction, MD 20701-0531

Telephone: (301) 362-8196
Fax: (301) 206-9789
Email: pubs@arl.org

EXECUTIVE SUMMARY

There is a critical need for research libraries to develop new statistics and measures to describe network services and resources. This study provides one approach for describing and measuring some of the resources, uses, and expenditures for supporting networked services in a research library setting. This manual is, nevertheless, one product of a larger effort to develop new measures and evaluation techniques by the Association of Research Libraries (ARL) http://www.arl.org/stats/newmeas/newmeas.html. The E-Metrics project, of which this report is one product, began in April 2000, and is scheduled for completion in December of 2001. The project is funded by a group of 24 ARL member libraries. Other key products from the E-Metrics project are still in process.

Based on a substantial field-testing process (described in detail in the report), the study team recommends a number of network **statistics** and **performance measures** that provide indicators of library networked services and resources. The **statistics** include:

- Patron accessible resources – Number of electronic full-text journals, Number of electronic reference sources, and Number of electronic books;
- Use of electronic resources and services – Number of electronic reference transactions, Number of logins (sessions) to electronic databases, Number of queries (searches) in electronic databases, Number of items requested in electronic databases, and Virtual visits to library's website and catalog;
- Expenditures for networked resources and related infrastructure – Cost of electronic full-text journals, Cost of electronic reference sources, Cost of electronic books, Library expenditures for bibliographic utilities, networks, and consortia, and External expenditures for bibliographic utilities, networks, and consortia; and
- Library digitization activities – Size of library digital collection, Use of library digital collection, and Cost of digital collection construction and management.

The performance measures are composite and/or combinations of the above network statistics along with, in some cases, non-network statistics already collected by ARL libraries (e.g., number of visitors to the library). The **performance measures** are:

- Percentage of electronic reference transactions of total reference transactions;
- Percentage of virtual library visits of all library visits; and
- Percentage of electronic books of all monographs.

These statistics and measures will provide research libraries with an important and useful set of tools to describe and assess network resources and services. The manual also provides libraries with guidance regarding the use to which the network statistics and measures can be put.

The report and manual offered here has a number of specific goals and objectives. Its primary goal is to provide a beginning approach for research libraries to better describe the use and users of their networked services. A secondary goal is to increase the visibility and importance of developing such statistics and measures. Specific objectives of the report and manual are to:

- Identify selected key statistics and measures that can describe use and users of electronic and networked services;
- Standardize procedures and definitions to collect these statistics and measures; and
- Increase awareness of selected issues related to collecting, analyzing, and reporting the data to produce these statistics and measures.

The statistics and measures offered here will need to be continually developed, expanded, refined, and possibly eliminated over time.

A key component of the project has been to work with vendors and other organizations regarding the collection, manipulation, and reporting of vendor-supplied online database data. Many of the statistics described here resulted from the cooperative efforts among these vendors and other national/international groups interested in developing such statistics. Such efforts should be continued.

The report also discusses developments related to the degree to which research libraries are able to help their larger institution reach its goals or institutional outcomes. These outcomes may be articulated in strategic planning documents, in conversations with the provost or academic deans, as part of regional accreditation standards, or in state legislation. Nonetheless, ARL libraries need to develop a process to identify and operationalize library outcomes that contribute to institutional outcomes. Establishing such a process allows the library to inform key stakeholders in the university of the library's role in institutional outcomes *and* insures that the institutional outcomes to which the library has (or may have) links are in fact appropriate. While progress has been made in this area of measurement, much work remains to be done.

There are a number of issues and challenges that will affect the library's ability to collect statistics and measures to describe its electronic resources and services. These issues and suggestions for how the library can best address and resolve them are discussed within the report. Some research libraries possess inadequate resources, staffing, and expertise to collect, manage, and report the data related to describing networked services. For these libraries, some organizational development and commitment to collecting and using these data may be necessary to take advantage of the measurement tools and techniques outlined in this report.

Given the rapidly changing technology environment, the changing milieu of higher education, changing organizational structures within ARL libraries, and the complexity of measuring such networked services, it is almost certain that the statistics and measures proposed in this study will continue to evolve. The measurement tools offered in this report, however, will provide research librarians with important techniques to count, describe, and report networked services and resources in their libraries.

TABLE OF CONTENTS

EXECUTIVE SUMMARY iii

ACKNOWLEDGEMENTS viii

HOW TO USE THIS REPORT x

PROJECT OVERVIEW xi

1 Context and Issues 1

- 1.1 Development of The Manual 2
- 1.2 Importance of Statistics and Measures for Networked Services 4
- 1.3 Conceptual Framework 5
- 1.4 Outcomes 15
- 1.5 Related Efforts 23

2 Field-Testing methodology and summary of findings 27

- 2.1 Evolutionary nature of statistics for networked resources and services 27
- 2.2 Field-testing Logistics 33
- 2.3 Summary of Results 34

3 Vendor Statistics Status Report 43

- 3.1 Phase I Activities Summary 43
- 3.2 ARL Meeting with Vendors 45
- 3.3 Vendor Statistics Field-testing 47
- 3.4 Issues and Future Actions 54

4 Data Collection Manual for the Recommended Network Statistics and Performance Measures 56

- 4.1 Recommended Statistics and Measures 56
- 4.2 Format of Data Collection Procedures for Performance Statistics and Measures 56
- 4.3 Data Collection Procedures for Performance Statistics and Measures 57

REFERENCES 81

APPENDICES 83

LIST OF FIGURES

P.1 Using Measures to Answer Questions at Different Levels........ xvii
1.1 Network Component Perspective 6
1.2 The Network Component Model 9
1.3 Network Resources Size and Volume Statistics and Measures 10
1.4 Extent of Use of Networked Resources and Services Statistics and Measures 10
1.5 Library Networked Resources and Services Cost Statistics and Measures 11
1.6 Outcomes Model 17
1.7 Using Measures to Answer Questions at Different Levels 18
2.1 Preliminary Statistics and Measures (E-Metrics version 1.0) 28
2.2 Revised Statistics and Measures (E-Metrics version 1.1) 29
2.3 Statistics and Measures Field Tested (E-Metrics version 2.0) 31
2.4 Actions to statistics and measures based on usefulness and practicality 39
3.1 List of Compared Vendor Reports 43
3.2 List of Database Vendors attended the ARL Meeting 45
C.1 Sample Electronic Resource Cost Report Form 96
C.2 Sample Consortia Expenditure Report Form 97
C.3 Sample Consortia Funding Report Form 98
C.4 Sample Library Digital Collection Inventory Report Form 98
C.5 Sample Digital Collection Items Added Report Form 99
C.6 Sample Library Digital Collection Report Form 99
C.7 Sample Digital Collection Access Report Form 100
C.8 Sample Digital Collection Cost Report Form –Personnel 100
C.9 Sample Digital Collection Cost Report Form 101

LIST OF TABLES

P.1 Recommended Statistics xiii
P.2 Recommended Performance Measures xiv
2.1 Usefulness rating for revised statistics and measures by category 30
2.2 Comparison of Field-testing Options 33
2.3 Field-testing Libraries 34
2.4 Field-testing Participation Results 35
2.5 Approximate time taken to collect data (in hours) 36
2.6 Examples of usefulness statements 38
2.7 Changes in the make-up of statistics and measures 39
3.1 Library Assignment for Vendor Statistics Field-Testing 47
3.2 Vendor Statistics Field-testing Participation 48
3.3 Key ICOLC Statistics Included in the Vendor Reports (by vendor) 49
3.4 Breakdown of Statistics in the Vendor Reports (by vendor) 50
4.1 Network Statistics 56
4.2 Performance Measures 56
B.1 List of Statistics and Measures Considered 94

ACKNOWLEDGEMENTS

The need for developing standardized definitions and procedures for selected electronic and networked statistics and measures for Association of Research Libraries is significant. Thus, the statistics, measures, and issues described in this report provide an important first step in describing users, uses, and impacts from electronic and networked services.

The report could not have been completed successfully without the assistance of a number of individuals and organizations. First, the study team wishes to acknowledge the 24 participating member organizations that have supported the project:

- University of Alberta
- Auburn University
- University of Connecticut
- University of Illinois-Chicago
- University of Maryland-College Park
- University of Nebraska-Lincoln
- University of Pennsylvania
- University of Pittsburgh
- University of Southern California
- Virginia Polytechnic Institute and State University
- University of Wisconsin-Madison
- Library of Congress
- Arizona State University
- University of Chicago
- Cornell University
- University of Manitoba
- University of Massachusetts
- University of Notre Dame
- Pennsylvania State University
- Purdue University
- Texas A&M University
- University of Western Ontario
- Yale University
- New York Public Library, The Research Libraries

At each of these libraries, liaisons and other individuals assisted the study team by providing input and suggestions to earlier drafts, by field-testing the statistics and measures, and by attending a number of meetings and discussions regarding the content of the report. We are deeply indebted to these organizations, the directors, the liaisons, and others at those organizations that participated directly in the project.

We also want to acknowledge the participation and assistance from a number of data base vendors and providers who participated in various meetings and discussions to help develop operational definitions procedures for these statistics and measures. These include:

- Academic Press/IDEAL
- Elsevier/ScienceDirect
- Lexis-Nexis
- Ovid
- Bell & Howell
- Gale Group
- netLibrary
- SilverPlatter
- EBSCO
- JSTOR
- OCLC/FirstSearch

Their involvement in the project demonstrates the interest and concern they have for standardizing some of the statistics and working with the library community to achieve this goal. We look forward to continuing our work with them in the future.

From the Association of Research Libraries we especially want to thank the assistance of Martha Kyrillidou, Lee Anne George, and Duane Webster. Their advice, suggestions, handling of logistics for meetings, etc., was instrumental in helping the study team complete the project. We especially appreciate their commitment to the study and their direct consultation and input throughout the development of this report.

We especially wish to acknowledge the leadership of Carla Stoffle, Dean of Libraries at the University of Arizona and Chair of the ARL New Measures Initiative. She has been a significant force in moving both the New Measures Initiative and the E-Metrics initiative forward. In addition, Sherrie Schmidt, Dean of Libraries at Arizona State University, and Rush Miller, University Librarian and Director, University of Pittsburgh Library System, have served as co-chairs of the E-Metrics Advisory Committee. Again, we greatly appreciate their work on the project, their suggestions and comments, and their direct participation in a number of meetings and data collection activities.

We also would like to thank Priscilla Caplan and Michele Newberry at the Florida Center for Library Automation (FCLA) for their thoughtful reviews of the field-testing instructions. Bonnie Gratch-Lindauer, Coordinator of Library Instructional Services at the City College of San Francisco Rosenberg Library, has contributed significantly to the outcomes focus with her analysis of accreditation standards.

Other individuals at other organizations, such as Denise Davis at the National Commission on Library and Information Science (NCLIS), Sue Phillips from the International Consortium of Library Consortia (ICOLC), and Pat Harris from the National Information Standards Organization, also contributed their time and ideas to material in this report.

Finally, we gratefully acknowledge the suggestions from a number of study participants. They provided the study team with excellent suggestions for improving the report. The report is clearly a stronger publication as a result of their comments and suggestions.

Wonsik "Jeff" Shim
Charles R. McClure
Bruce T. Fraser
John Carlo Bertot
Arif Dagli
Emily H. Leahy
Don L. Latham
Benjamin Keith Belton
Linda Carruth

October 2001

HOW TO USE THIS REPORT

This is an extensive report in terms of length and topics discussed. Although you are encouraged to read the entire report, the information below is offered to help you locate those sections you find most useful.

The report contains the following:

- The Project Overview (pp. xi-xx) summarizes the information in parts 1, 2, 3, and 4;
- Part 1 (pp. 1-26) includes the context and issues for the project;
- Part 2 (pp. 27-42) discusses library statistics field-testing;
- Part 3 (pp. 43-55) discusses database vendor statistics field-testing;
- Part 4 (pp. 56-80) contains the data collection manual. Appendix C (pp. 96-101) has sample forms.

☐ If you are ***primarily*** interested in the manual, we encourage you to read the Project Overview to understand the contexts and development of the statistics and measures before you read the manual. The manual includes a definition, rationale, procedures, and related issues concerning collecting and using each statistic and performance measure.

☐ For a detailed discussion of the issues related to the need for and use of statistics and measures of networked services in academic and research libraries, please review part 1. It provides an introduction to the E-Metrics project as well as other related initiatives. For a discussion of the outcomes-related evaluation of library services, please review section 1.4.

☐ If you are interested in the field-testing of proposed statistics and performance measures at the participating libraries, please review part 2, which includes methodology, results and lessons learned.

☐ If you are interested in the database vendor statistics portion of the field-testing, please review part 3.

This document will be available in electronic form on the ARL website at http://www.arl.org/stats/newmeas/emetrics. The manual (part 4) and training materials will be available in January 2002 in both print and electronic formats through ARL.

PROJECT OVERVIEW

This study provides one approach, a beginning approach, for describing and measuring some of the resources, uses, and expenditures for supporting networked services in a research library setting. Such statistics and measures are essential for collections decisions; cost analysis; justification of services; services planning and evaluation; and a host of other activities. This manual is a *first* effort to accomplish these objectives and to standardize data collection techniques, definitions, and procedures related to network and electronic resources and services.

The working definition of networked services is *those electronic information resources and/or services that users access electronically via a computing network (1) from on-site in the library (2) remote to the library, but from a campus facility, or (3) remote from the library and campus.* Examples of networked resources include local, regional, and statewide library hosted or authored web sites and library-licensed databases (e.g., InfoTrac, EBSCOHost, JSTOR, Project Muse).

Examples of networked services include:

- Text and numerical databases, electronic journals and books;
- Email, listservs, online reference/assistance;
- Training in the use of these resources and services;
- Request for services via online forms (i.e., interlibrary loans).

The range and types of services accessible through and supported by networks will continue to evolve as network technology changes. While there is excitement with all the developments related to the provision of networked services, there are a number of challenges that require resolution in the area of statistics and measures for networked services.

This manual is but one product of a larger effort to develop new measures and evaluation techniques by the Association of Research Libraries (ARL) http://www.arl.org/stats/newmeas/newmeas.html. The New Measures Initiative has a number of projects of which this one, *The E-Metrics Project: Developing Statistics And Performance Measures To Describe Electronic Information Services And Resources For ARL Libraries,* specifically concentrates on developing, field-testing, and refining selected core statistics and measures to describe use and users of networked services http://www.arl.org/stats/newmeas/emetrics/index.html. This manual is one of the primary products from the E-Metrics project.

Readers of this manual should also review the other ARL project initiatives in this area (see http://www.arl.org/stats/newmeas/newmeas.html) as the manual is best seen as part of the overall work in this area. Moreover, use of this manual may be more effective when coordinated and administered in conjunction with other ARL New Measures initiatives.

E-METRICS PROJECT

The E-Metrics project, which began in April 2000, and is scheduled for completion in December of 2001, is funded by a group of 24 ARL member libraries. The primary goals of this project are to:

- Develop, test, and refine selected statistics and performance measures to describe electronic services and resources in ARL libraries;
- Engage in a collaborative effort with selected database vendors to establish an ongoing means to produce selected descriptive statistics on database use, users, and services;
- Develop a model to describe possible relationships between library activities and library/institutional outcomes;
- Develop a proposal for external funding to maintain the development and refinement of networked statistics and performance measures.

This report addresses the first three of these goals. An interim Phase I Report describing current practices of participating ARL member libraries related to network statistics and measures was issued November 7, 2000, and can be found at:
http://www.arl.org/stats/newmeas/emetrics/index.html.

Other key components of the E-Metrics project are still in process. The study team is developing a model to describe institutional outcomes and the degree to which library activities may be related to institutional outcomes. A final product from the E-Metrics project will be a proposal that may be submitted to an appropriate funding agency to continue research and development work in the area of statistics, measurement, and research library outcomes. That proposal will be completed by the end of December 2001. Additional information regarding the project goals, objectives, and deliverables is contained in the statement of work located in Appendix A.

GOALS AND OBJECTIVES OF THE MANUAL

As with all projects, the manual offered here has a number of specific goals and objectives. Its primary goal is to provide a beginning approach for research libraries to better describe the use and users of their networked services. A secondary goal of the manual is to increase the visibility and importance of developing such statistics and measures. Specific objectives of the manual are to:

- Identify selected key statistics and measures that can describe use and users of electronic and networked services;
- Standardize procedures and definitions to collect these statistics and measures;
- Increase awareness of selected issues related to collecting, analyzing, and reporting the data to produce these statistics and measures.

The study team expects that this manual will be a continually evolving product. The statistics and measures offered here will continue to need to be developed, expanded, refined, and possibly eliminated over time.

This manual continues and extends the work being done from a number of previous projects (see discussion in Part 1). The manual does *not*, however:

- Offer a comprehensive list of statistics and measures for networked services; clearly additional statistics and measures are possible and may need to be developed, tested, and refined;
- Make specific linkages between the statistics and measures described in this manual to library and institutional outcomes;
- Resolve a number of definitional and procedural issues among database vendors and other standards organizations on how to report database data - continued discussions and work in this area are needed;
- Assist library decision-makers in determining which statistics and measures, strategically and politically, would be best to use in a particular library setting;
- Suggest possible organizational structures and resources needed for a library to successfully collect, manage, and report the data.

There is a range of situational factors and data needs/expectations that vary considerably from research library to research library. This manual will not meet all those needs and expectations. Readers should consider this manual as one tool (of many) that can assist a library in describing and evaluating networked services use and users.

RECOMMENDED STATISTICS AND PERFORMANCE MEASURES

Based on a substantial field-testing process (described in detail in this report), the project team recommends the following network **statistics (Table P.1)** and **performance measures (Table P.2)**. The statistics and performance measures provide indicators of library networked services and resources.

Table P.1 Recommended Statistics

Patron Accessible Electronic Resources	R1 Number of electronic full-text journals R2 Number of electronic reference sources R3 Number of electronic books
Use of Networked Resources and Services	U1 Number of electronic reference transactions U2 Number of logins (sessions) to electronic databases U3 Number of queries (searches) in electronic databases U4 Items requested in electronic databases U5 Virtual visits to library's website and catalog
Expenditures for Networked Resources and Related Infrastructure	C1 Cost of electronic full-text journals C2 Cost of electronic reference sources C3 Cost of electronic books C4 Library expenditures for bibliographic utilities, networks, and consortia C5 External expenditures for bibliographic utilities, networks, and consortia
Library Digitization Activities	D1 Size of library digital collection D2 Use of library digital collection D3 Cost of digital collection construction and management

The performance measures are composite and/or combinations of the above network statistics along with, in some cases, non-network statistics already collected by ARL libraries (e.g., number of visitors to the library).

Table P.2 Recommended Performance Measures

Performance Measures	P1 Percentage of electronic reference transactions of total reference P2 Percentage of remote library visits of all library visits P3 Percentage of electronic books to all monographs

Using the Network Statistics and Performance Measures

The recommended network statistics and performance measures, either independently or in some combination, can assist research libraries in describing a number of aspects of their networked resources and services. This section provides libraries with some guidance regarding the use to which the network statistics and measures can be put.

Although the statistics and measures presented in this manual fall under a number of network components, it is possible to categorize broadly the statistics and measures into statistics and measures that identify:

1. *The overall size/volume of available networked resources.* By collecting and reporting the recommended statistics, libraries are able to identify their total number of journals available electronically in full-text format (e-journals); reference sources available electronically to staff and patrons; books available electronically (e-books); and items digitized from the library's own collection (e.g., documents digitized and mounted through a network accessible method). Also, by combining R3 (number of electronic books) with a count of library print monographs, libraries can determine the overall percentage of books available in electronic format to the populations that they serve (P3).
2. *The extent to which the networked resources and services are used by the library's service population.* The use statistics enable libraries to identify the overall number of sessions to library database subscription services, with a number of sub-categories if desired (e.g., location, per title, etc.); number of queries conducted by users of the database subscription services, with a number of sub-categories if desired (e.g., location, per title, etc.); number of items requested (e.g., printed, e-mailed, saved, or otherwise accessed) by users of the database subscription services, with a number of sub-categories if desired (e.g., location, per title, etc.); number of visits to library-maintained virtual resources (e.g., web pages), with a number of sub-categories if desired (e.g., location – virtual v. in-library); number of accesses and queries conducted by library service users of library-maintained virtual resources, with a number of sub-categories if desired (e.g., location – virtual v. in-library); and number of electronic reference transactions conducted.
3. Through a combination of the U1 (number of electronic reference transactions) and U5 (virtual visits) network statistics and traditional statistics of reference transactions and library visitors, libraries can gain a sense of the ratio of electronic reference to total reference transactions, as well as the ratio of virtual (remote) library visits to physical library visits. These provide important trend indicators for the use of selected networked library resources and services.
4. *The cost to the library of providing the networked resources to its service population.* The statistics provide libraries with cost data that indicate the cost of subscribing to and/or purchasing online full-text journals; the cost of subscribing to and/or purchasing online reference sources; the cost of subscribing to electronic books (e-books); library expenditures for online material provided through participation in local, regional, and/or national consortia NOT included in database subscription services; the expenditures of non-library entities (e.g., state-wide resources provided through consortia or governmental agencies) on behalf of libraries for subscription services; and the costs associated with library digitization activities—including equipment, software, contracted services, personnel, other).

The use of these statistics, particularly in combination, can enable research libraries to answer a number of questions regarding network services and resources as detailed in the manual.

A Note on the Vendor Statistics

The vendor field-test component of the project identified a number of process, administrative, and management issues regarding the collection, manipulation, and reporting of vendor-supplied online database usage data:

- Are the data provided to libraries reliable?

  Since the field-testing dealt with only one month's worth of data, it is difficult to answer the question. On the other hand, we have not heard from field-testing libraries of any usual discrepancy between the field-testing data and data they had received before the field-testing. The study team realizes that simply comparing data from the same vendors will not give us a satisfactory answer. During the course of writing this report, we came across an email message from a major database vendor acknowledging errors in their usage reports. While the vendor did the right thing by admitting their fault, it shows us that libraries are not in a good position to know about what goes into the vendor reports. Some unusual numbers or patterns are relatively easy to identify. But consistent under - or over - counts will be hard to detect.

  One way to deal with the reliability issue is for libraries to collect data in-house. For example, some libraries have set up redirect webpages for external databases to count the number of attempted logins to licensed databases. This kind of data can be used to cross-check vendor-supplied numbers. Also, the library community needs to consider concrete ways (e.g., third party validation) to ensure consistent and reliable reporting from the vendors, or at least should demand better documentation of the data collection and filtering process from the vendors.

- Are the data comparable across libraries, products, and vendors?

  Use of different system parameters (e.g., time-out), the application of different assumptions on user behaviors (e.g., how to treat or count multiple clicks on the same document within a session), and the lack of adequate explanation in vendor documentation regarding specific definitions and data collection and filtering processes all contribute to the problem. Therefore, it is largely impossible to compare data across vendors and as a result, comparison should be limited to data from the same vendors. The comprehensive standardization of usage statistics and data delivery methods (e.g., file format and data arrangement) cannot be easily achieved in the short-term. Those are the long-term goals for which vendors and libraries need to work together. The ARL community should continue to make progress in this area by working amongst themselves and with the database vendor community.

- Are the data easy to obtain and manipulate?

  We believe that the data provided by the vendors studied are easy to obtain and manipulate. Most vendors offer several data formats including text format (e.g., comma separated file) and spreadsheet format (e.g., MS Excel) in addition to standard HTML format for easy viewing in web browsers. Also, many vendors offer ad-hoc report generation whereby libraries can customize the fields they want to get and set desired time periods.

However, processing vendor reports from multiple vendors can be a considerable burden on libraries, in terms of time and staff efforts, as the formats and data arrangements vary considerably from vendor to vendor. Therefore, vendors should report standardized usage statistics, such as the ones recommended by the ICOLC, in one report in the standardized column and row arrangements and provide a separate report that contains vendor specific additional data.

- Do the data provide meaningful information about the usage of networked information resources?

  Usage statistics currently being provided by vendors give useful information regarding the utilization of external subscription-basis information services. Libraries use data for a variety of purposes: usage trends over time, justification for expenditures, cost analysis, modification of service provision. Related to the issue of the value of data is trustworthiness (reliability) of data. Also, there is some concern over the lack of user-related information in usage statistics.

These issues point to a number of recommendations included in this report. They also reiterate the importance of continued ARL collaboration with the vendors and the library community as a whole (e.g., ICOLC, NISO, ISO, publishers) as there is substantial interest in online database usage statistics.

INSTITUTIONAL OUTCOMES

University research libraries are established to support the broad research, education, and service goals that are fundamental to the mission of the institutions they serve. Beyond helping to fulfill the university mission, a research library must be able to help the larger institution reach its more concrete but shifting goals. These goals may be articulated in strategic planning documents, in conversations with the provost or academic deans, as part of regional accreditation standards, or in state legislation.

It is important for the library to be aware of these goals and to be able to target library resources, services, and programs to help meet institutional goals. Doing so is critical to the library being perceived as a vital, contributing part of the university. To address these goals and measure them effectively, it is important to ask three key questions:

1. What is the desired state of the university?
2. How can the library help the university to achieve this state?
3. How will the library know when it has been successful in helping the university achieve this state?

The first question helps the library better understand the operating environment. Knowing what the university wants to be now and in the future helps library administrators understand what customers need.

The second question helps the library in making decisions about which of the many goals of the university are helpful for the library to focus on. Also, answering this question helps the library in making decisions about what action it must take to contribute to the fulfillment of those goals. Existing services and programs may address them, programs may have to be fine-tuned and resources upgraded, or new programs and resources may need to be developed and acquired.

The third question helps the library craft the measures that will provide indications of success. This is extremely important and must be considered carefully because direct outcomes measurement is often difficult or impossible. It may be necessary to develop several measures that work together to indicate an outcome or to use surrogate measures, such as perception surveys. One framework for developing such measures is described below.

The order in which these questions are addressed is also vital. Before measurements can be derived, library administrators must know what impact their library can have on matters of importance to the university and to the library. Without this perspective, outcomes measurement loses meaningfulness. In other words, it is very difficult to gain useful insights about outcomes when measures are not designed with outcomes explicitly in mind.

ARL libraries may currently collect measures that can provide some indication of the success of a particular program or service provided to customers, such as user satisfaction surveys; however, it is important to think broadly—with the desired state in mind—and not simply use the measures at hand because they are easy to collect or because a lot of time and effort has been devoted to collecting them.

In most cases, a single measure on its own is not enough to indicate whether a research library is successful in a given area. To accurately indicate the success or quality of an academic library, measurement should be implemented at three key levels (see Figure ES-2):

- Outcome Level
- Use/Capacity Level (Output)
- Resource level (Input)

Following this approach, however, may lead to the formulation of a wide range of performance measures and statistics. Selection of the precise measures needed to evaluate an electronic resource or service can be especially difficult, even for libraries that have undertaken processes similar to those described above. Therefore, it is important to have a framework to assist in choosing measures to gain insights into the use and users, management, and reach of networked services and resources in specific areas or across a number of areas.

Figure P. 1 Using Measures to Answer Questions at Different Levels

Outcome Level	Use/Capacity Level (Output Measures)	Resource Level (Input Measures)
What are the results of a program or process?	How much is a service, resource, or program being used?	What do we need to ensure success?
How successful or effective is the library?	Who is using a service, resource, or program?	What funding level is appropriate or necessary for a particular program?
How effective do customers perceive your programs to be?	Why are people using a particular program?	Do we need more of a particular resource in order to have a more effective program?
What beneficial effects are you having on your customers?		
How could a program be changed to better suit the needs of your customers?		

The Importance of Developing Outcomes Processes

As discussed in the preceding section, ARL libraries need to develop a process to identify and operationalize library outcomes that contribute to institutional outcomes. The library plays a critical role in informing the university of valued institutional outcomes to which the library contributes. Setting up such a process allows the library to inform key stakeholders in the university of both the library's role in institutional outcomes and insures that the institutional outcomes to which the library has (or may have) links are in fact appropriate.

Because each university has different processes for information sharing, decision-making, and mission fulfillment, it is important that each university library identify, understand, and master the established local process. It is a given that libraries must work within their particular organizational framework. Therefore, to maximize contributions to university outcomes, the library must orient itself to and operate with the fullest advantages of that local framework.

An important factor that contributes to an effective understanding of the local situation is sensitivity to the differing viewpoints of various stakeholder groups. What might constitute institutional outcomes, or appropriate institutional outcomes, will vary from one group to another (deans, faculty, trustees, students, etc.). It may be that the outcomes from the library (as agreed-upon by library staff and administration) may or may not be those seen by university administration as important or appropriate. Developing a process to address these potentially conflicting stakeholder concerns at the local level is particularly crucial.

KEY ISSUES IN THE NETWORKED ENVIRONMENT

In general, despite the fact that many of the recommended statistics are gross figures and concerned mostly with resource counts and costs, data collection is not an easy process. There are a number of issues and challenges that affect the library's ability to collect statistics and measures to describe its electronic resources and services:

- *Acquisitions, accounting, and cataloging systems are not set up to support this kind of data collection.* Current bibliographic and management information systems, for the most part, reflect practices in the pre-Web, print-dominant environment. It appears that providing access to electronic resources is keeping many research libraries busy enough already. The lack of efficient information systems that pull together elementary data elements forced many field-testing libraries to resort to labor-intensive processes to collect data. According to a recent survey done by Tim Jewell at the University of Washington Libraries, there are about 10 ARL libraries that have a production system for managing electronic resources, and several others in the planning or development stage (http://www.library.cornell.edu/cts/elicensestudy/home.html). While these systems are not developed solely for data collection purposes, they certainly facilitate data collection efforts such as the E-Metrics project. In the absence of such fully developed information systems, we advise ARL libraries to develop, at a minimum, an in-house spreadsheet or database file to keep track of key data elements related to electronic resources and services.
- *Prescribed definitions and procedures are not compatible with local practices.* Several field-testing libraries independently have been collecting some of the similar statistics and measures, but their definitions and promulgation of the methodologies differ from what the field-testing entailed. It seems that the majority of libraries want to build their local procedures in sync with the standardized ARL practices, a sentiment that is echoed in the following comment: "We will adjust our in-house practices to be able to report in this way." The data collection manual produced from this study is one step in that direction.
- *The nature of electronic resources and services is still fluid and makes it difficult to devise clear-cut definitions and procedures.* For instance, as several people have already argued (Snowhill, 2001; Sottong, 2001), the concept of electronic books is still evolving due to changes in

technology, the market, and use of resources among other things. As an illustration, think of the full-text search capability in most electronic books. It can be argued that there is no clear distinction between electronic books and reference sources, especially from the user's point of view. Electronic access can trigger an entirely new conceptualization of a given information object as in the case of electronic books. Libraries need to deal with the implications of this changing environment and be more flexible. We acknowledge that the distinction made for different electronic resources in the study and in the current E-Metrics work is only temporary and will have to be revised as we progress.

- *The dispersed nature of resources in the networked environment makes it difficult to consolidate and manage statistics.* It is also a growing source of frustration for many librarians who deal with electronic resources. Various listservs devoted to electronic resources and voluminous correspondence in the listservs reflect this trend. Traditionally, library materials, with a notable exception of government publications, are centrally managed through a library catalog. Also, library visit counts have traditionally been normalized by using turnstile counts whenever possible. However, in the networked environment, libraries have to deal with a whole range of resources and access points. This in turn creates more complexity in not only managing resources but also collecting data about the resources and their use. For example, with respect to usage statistics of licensed materials, while setting up a library database gateway may allow the library to collect a coherent statistic (e.g., attempted logins to licensed databases), it does not account for traffic that goes directly to vendor websites. On the other hand, usage statistics from database vendors are more complete in the sense that they capture all requested use of the database, but the incompatibility of statistics from various vendors makes it difficult for the libraries to compare and aggregate usage data. Therefore, it is important that libraries be able to deal with incomplete, incompatible data from multiple sources and make the best decisions based on the given data.
- *There are a number of definitional and procedural issues among database vendors, library consortia (e.g., ICOLC), and other standards organizations (e.g., NISO, ISO) on how to report database usage statistics.* Working with major database vendors is one of the important areas to concentrate on in the future. Our study initiated dialogue with selected vendors and their involvement proved to be very useful and needs to be continued.
- *The findings indicate that there are varying levels of resources and support available in the libraries to support data collection and reporting.* The degree to which libraries will be able to collect these data and use them is linked to the amount of resources they can commit.
- *There are a range of situational factors and data needs/expectations that vary considerably from research library to research library.* Individual libraries will need to determine which statistics and measures would be best to use, strategically and politically, in their own settings. They will also need to consider possible organizational structures and resources needed to successfully collect, manage, and report the data.

These issues are not insurmountable. They require, however, additional research efforts as well as continued effort by libraries to collect, analyze, and use the network statistics and performance measures for management and decision-making purposes.

EXPANDING MEASUREMENT TOOLS

The explosion of networked information services has been relatively recent and the impact from this increase of services and the corresponding technology is only beginning to be understood. An ever-increasing portion of library collections' dollars is committed to purchasing networked services. Yet relatively little is known about how these services are used, who uses them, and what impact these services have.

Many research libraries possess inadequate resources, staffing, and expertise to collect, manage, and report the data related to describing networked services. For these libraries, some organizational development and commitment to collecting and using these data may be necessary to take advantage of the measurement tools and techniques outlined in part 4. Nonetheless, the discussion of the measurement issues in parts 1-3 can assist these libraries to better understand why such measurement is essential.

Given the rapidly changing technology environment, the changing milieu affecting higher education, changing organizational structures within ARL libraries, and the complexity of measuring such networked services, it is almost certain that the statistics and measures proposed in this study will continue to evolve. The measurement tools offered in this report, however, will provide research librarians with important techniques to count, describe, and report networked services and resources in their libraries.

1 CONTEXT AND ISSUES

This report is but one product of a larger effort by the Association of Research Libraries (ARL) to develop new measures and evaluation techniques. The New Measures Initiative includes a number of projects, of which this one, *The E-Metrics Project: Developing Statistics And Performance Measures To Describe Electronic Information Services And Resources For ARL Libraries,* specifically concentrates on developing, field-testing, and refining selected core statistics and measures to describe use and users of networked services (http://www.arl.org/stats/newmeas/emetrics/index.html). This manual is one of the primary products from the E-Metrics project. As such, it represents a first effort to accomplish these objectives and to standardize data collection techniques, definitions, and procedures related to network and electronic resources and services. Readers of this manual should also review the other ARL project initiatives in this area (see http://www.arl.org/stats/newmeas/newmeas.html) as the manual is best seen as part of the overall work in this area. Moreover, use of this manual may be more effective when coordinated and administered in conjunction with other ARL New Measures initiatives.

The E-Metrics project began in April 2000, is scheduled for completion in December of 2001, and is funded by a group of 24 ARL member libraries. The primary goals of this project are to:

- Develop, test, and refine selected statistics and performance measures to describe electronic services and resources in ARL libraries;
- Engage in a collaborative effort with selected database vendors to establish an ongoing means to produce selected descriptive statistics on database use, users, and services;
- Develop a model to describe possible relationships between library activities and library/institutional outcomes; and
- Develop a proposal for external funding to maintain the development and refinement of networked statistics and performance measures

This report addresses the first three of these goals. An interim, Phase I Report describing current practices of participating ARL member libraries related to network statistics and measures was issued November 7, 2000, and can be found at: http://www.arl.org/stats/newmeas/emetrics/index.html. Appendix A contains the original study proposal.

Other key components of the E-Metrics project are still in process. The study team developed a model to describe institutional outcomes and the degree to which library activities may be related to institutional outcomes. A final product from the E-Metrics project will be a proposal that may be submitted to an appropriate funding agency to continue research and development work in the area of statistics, measurement, and academic library outcomes. That proposal will be completed by the end of December 2001.

1.1 DEVELOPMENT OF THE MANUAL

The manual (Part 4 of this report) is based on a number of earlier activities. Initially, the study team conducted a number of site visits to determine best practices at selected *ARL* libraries regarding networked services statistics and measures. This activity resulted in the Phase I Report. The Phase I Report provided an important context for the current use of statistics and measures by participating members. Equally important, it provided a basis for the study team to propose possible statistics and measures that would best meet the needs of participating members.

While that activity progressed, the study team set in motion a process to meet with selected database vendors to begin a dialogue about how to best coordinate and standardize data collection procedures and definitions so that libraries could compare and better use data provided by these vendors. This process, which continued through 2001, involved identifying appropriate individuals, meeting with them, and scheduling group meetings.

In addition, the discussions about these data collection procedures were coordinated with other organizations such as NISO (National Information Standards Organization), ICOLC (International Coalition of Library Consortia), and NCLIS (National Commission on Libraries and Information Science). Additional input came from the study team's work on developing a model to describe the relationship between library activities and larger institutional outcomes.

Participating members in the E-Metrics project reviewed proposed statistics and measures. They then provided the study team with feedback as to which would be most useful and important. This information was provided through a number of members and via the project discussion list. A preliminary list of statistics and measures were field-tested by a number of members. A member of the study team visited selected field-test sites to better understand how the statistics and measures were being used. Throughout the process the study team consulted other experts in the field as well as appropriate writings and research on the topic.

Participating members have had significant and on going input into the development of these statistics and measures. Indeed, were it not for this involvement, the manual could not have been produced. Based on these and other activities, the study team developed a draft manual that was then reviewed by selected experts. The participation by members and the reviewer comments, as well as the review by the study team itself, led to the version of the manual presented here.

1.1.1 OBJECTIVES OF THE MANUAL

As with all projects, the manual offered in part 4 has a number of specific goals and objectives. Its primary goal is **to provide a beginning approach for research libraries to better describe the use and users of their networked services**. A secondary goal of the manual is **to increase the visibility and importance of developing such statistics and measures**. Specific objectives of the manual are to:

- Identify selected key statistics and measures that can describe use and users of electronic and networked services;
- Standardize definitions of these statistics and measures and standardize procedures for collecting them;
- Increase awareness of selected issues related to collecting, analyzing, and reporting the data to produce these statistics and measures.

The study team expects that this manual will be a dynamic product. The statistics and measures offered here will continue to need to be developed, expanded, refined, and possibly eliminated over time.

A number of objectives are, however, *beyond* the scope of this manual. The manual does not, for example,

- Offer a comprehensive list of statistics and measures for networked services – clearly additional statistics and measures are possible and may need to be developed, tested, and refined;
- Address measurement of service quality;
- Make specific linkages between the statistics and measures described in this manual to library and institutional outcomes;
- Resolve a number of definitional and procedural issues among database vendors and other standards organizations on how to report database data – continued discussions and work in this area are needed;
- Assist library decision-makers in determining which statistics and measures, strategically and politically, would be best to use in a particular library setting;
- Suggest possible organizational structures and resources needed for a library to successfully collect, manage, and report the data.

Situational factors and data needs/expectations vary considerably from research library to research library. While there are many exciting opportunities related to the provision of networked services, there are a number of challenges that require resolution in the area of statistics and measures for networked services. This manual provides *one* approach, a *beginning* approach, to offer procedures for describing and measuring some of the uses and users of networked services in a research library setting.

1.1.2 ORGANIZATION OF THE REPORT

This report has four major parts:

- Part 1 provides an overall introduction to the importance of statistics and measures in a networked services environment, a description of some of the characteristics of that environment, and an explanation of how those characteristics may impact the use and application of statistics and measures.
- Part 2 provides a description of the evolving nature of statistics in a networked library environment and a description of the field-testing methods and procedures used by the study team.
- Part 3 describes activities that have been accomplished by the study team in cooperation with vendors and project participants related to usage statistics provided by vendors.
- Part 4 is a procedural manual for the collection and implementation of the statistics and measures.

1.2 IMPORTANCE OF STATISTICS AND MEASURES FOR NETWORKED SERVICES

1.2.1 NEED FOR NETWORKED STATISTICS

The development of library networked statistics and performance measures is receiving increased attention and support. There is a broad recognition for the need of network statistics and performance measures that:

- Assist libraries in making a strong case for support of technology and information infrastructure by documenting their Internet-based services and resources;
- Assist libraries in demonstrating the use of digital collections in order to make a case for continued collection development and support;
- Allow libraries to effectively compare themselves to others in terms of Internet-based collection and service development, costs, provision of services, connectivity, and use;
- Allow libraries to measure and track internal changes to library operations as well as uses and users of library resources and services;
- Enable library directors and administrative library agencies to compete for resources with other organizations and/or departments by documenting the range, extent, and impact of library-provided networked services;
- Facilitate the expansion from traditional library use measures such as circulation, reference transactions, interlibrary loans, etc., to include network measures that describe the nature and use of library-based network activities and resources;
- Provide a decision-making framework for library staff, managers, and administrators to determine resource allocation strategies and meet other management needs;
- Provide a means through which to measure the quality of library services and resources in the networked environment.

These and other factors point to the overall importance for the development, collection, and reporting of library network statistics and performance measures to facilitate collections decisions, cost analysis, justification of services, services planning and evaluation, and a host of other activities.

The working definition of networked services is *those electronic information resources and/or services that users access electronically via a computing network (1) from on-site in the library, (2) remote to the library, but from a campus facility, or (3) remote from the library and campus.* Examples of networked resources include local, regional, or statewide library hosted or authored web sites or library-licensed databases (e.g., InfoTrac, EBSCOHost, JSTOR, Project Muse). Examples of networked services include:

- Text and numerical databases, electronic journals and books;
- Email, listservs, online reference/assistance;
- Training in the use of these resources and services; and
- Request of services via online forms (i.e., interlibrary loans).

The range and types of services accessible through and supported by networks will continue to evolve as network technology changes.

1.2.2 CURRENT CONTEXT FOR NETWORKED SERVICES MEASUREMENT

An earlier effort by McClure and Lopata (1996) offered a number of strategies and measures to assess the academic networked environment. But, the explosion of networked information services has been relatively recent and the impacts from this increase of services and the corresponding technology are only beginning to be understood. An ever-increasing portion of library collections dollars are committed to purchasing networked services. Yet relatively little is known about how these services are used, who uses them, and what the overall impact of these services is.

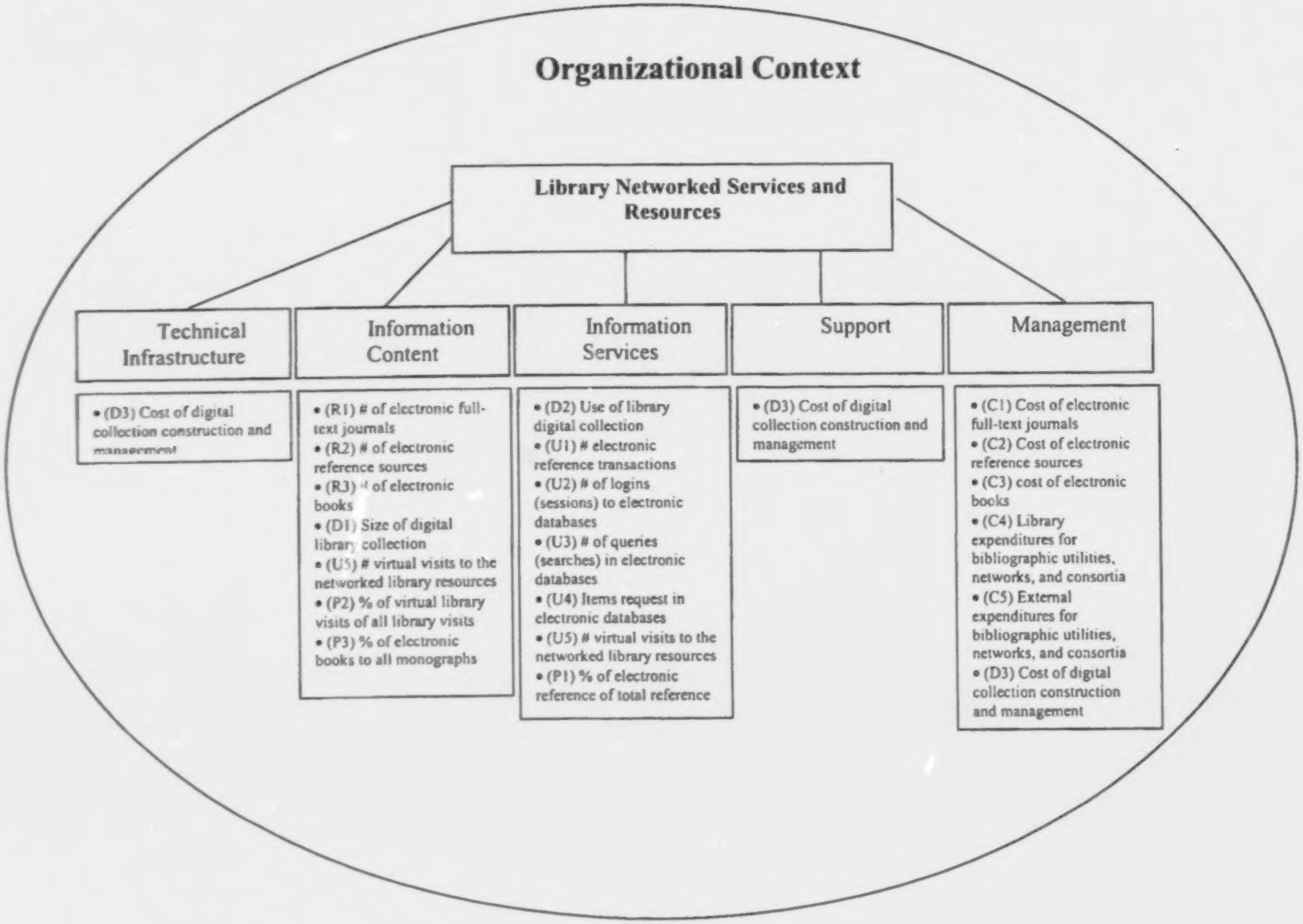
Implementing effective measurement standards and techniques is complicated by the technology infrastructure in place at many ARL libraries, the membership of libraries in larger consortia that share access to (and cost of) networked services, and the various configurations used by vendors to supply these networked services. In addition, as found in the Phase I Report, many research libraries simply have inadequate resources, staffing, and expertise to collect, manage, and report the data related to describing networked services.

As often stated by Carla Stoffle, Dean of Libraries at the University of Arizona and current Chair of the ARL Statistics and Measurement Committee, "Developing measures and evaluation techniques for networked services will take time, effort, and on going learning on everyone's part – but we must begin now". Given the rapidly changing technology environment, the changing milieu affecting higher education, changing organizational structures within ARL libraries, and the complexity of measuring such networked services, it is likely that the statistics and measures proposed in this manual will continue to evolve. This manual, therefore, serves as an important *first* effort in establishing standards for such statistics and measures.

1.3 CONCEPTUAL FRAMEWORK

This section of the report (1) provides a framework to assist libraries to select, use, and understand network statistics and performance measures based on various aspects of a library's network(s); (2) provides a rationale for collecting and managing network statistics and measures; and (3) identifies issues that libraries should consider while undertaking network statistics and measures collection and reporting activities.

Figure 1. 1 Network Component Perspective


Organizational Context
Library Networked Services and Resources
Technical Infrastructure
Information Content
Information Services
Support
Management
• (D3) Cost of digital collection construction and management
• (R1) # of electronic full-text journals
• (R2) # of electronic reference sources
• (R3) # of electronic books
• (D1) Size of digital library collection
• (U5) # virtual visits to the networked library resources
• (P2) % of virtual library visits of all library visits
• (P3) % of electronic books to all monographs
• (D2) Use of library digital collection
• (U1) # electronic reference transactions
• (U2) # of logins (sessions) to electronic databases
• (U3) # of queries (searches) in electronic databases
• (U4) Items request in electronic databases
• (U5) # virtual visits to the networked library resources
• (P1) % of electronic reference of total reference
• (D3) Cost of digital collection construction and management
• (C1) Cost of electronic full-text journals
• (C2) Cost of electronic reference sources
• (C3) cost of electronic books
• (C4) Library expenditures for bibliographic utilities, networks, and consortia
• (C5) External expenditures for bibliographic utilities, networks, and consortia
• (D3) Cost of digital collection construction and management

BEST COPY AVAILABLE

1.3.1 THE NETWORK COMPONENT PERSPECTIVE AS A FRAMEWORK FOR DEVELOPING AND SELECTING NETWORK STATISTICS AND MEASURES

The Network Component Perspective serves as a useful mechanism through which to select and measure specific aspects of a library's networked services and resources along a number of network aspects.

As first described by Bertot and McClure (1996), and validated throughout other research studies, the Network Component Perspective provides a framework for the development of electronic statistics and performance measures (see Figure 1.1). This perspective suggests that there are a number of measurable components to electronic networks:

- Technical infrastructure: The hardware, software, equipment, communication lines, and technical aspects of the network (e.g., workstations, modems, servers);
- Information content: The information resources available on the network (e.g., local government information, special collections, JSTOR, ScienceDirect);
- Information services: The activities in which users can engage and the services that users may use to complete various tasks (e.g., online reference services, usage of digital information content);
- Support: The assistance and support services provided to help users better use the network (e.g., training, help desk);
- Management: The human resources, governance, planning, and fiscal aspects of the network (e.g., network staff, advisory boards, budgeting).

These network components provide a means through which to consider the type of statistics and performance measures that would enable research libraries to describe and evaluate their networked services and resources.

It is possible to look at the information content aspect of a network and consider network statistics and performance measures for that aspect of library networked services, thus enabling one to map the network statistics and performance measures as presented in Part 4 of this report.

The notations in parentheses here and in Figure 1.1 refer to the statistics and measures presented in detail in Part 4 of this report.

- Technical Infrastructure

(D3) Cost of digital collection construction and management;

- Information Content

(D1) Size of digital library collection;
(P1) Percentage of electronic reference of total reference;
(P2) Percentage of virtual library visits of all library visits;
(P3) Percentage of electronic books to all;
(R1) Number of electronic full-text journals;
(R2) Number of electronic reference sources;
(R3) Number of electronic books;

(U5) Number of virtual visits to the networked library resources;

- Support

(D3) Cost of digital collection construction and management;

- Management

(C1) Cost of electronic full-text journals;
(C2) Cost of electronic reference sources;
(C3) Cost of electronic books;
(C4) Library expenditures for bibliographic utilities, networks, and consortia;
(C5) External expenditures for bibliographic utilities, networks, and consortia;
(D3) Cost of digital collection construction and management.

Using this approach, libraries can gain a sense of the use and uses, management, and reach of their networked services and resources in specific areas or across a number of areas. In addition, libraries can look in-depth at particular aspects of their networked services and resources. Moreover, by selecting statistics and performance measures relevant and of interest to library staff and managers required for reporting purposes, or other motivational factors, it is possible for libraries to develop an overall sense of their networked services and resources along a network dimension. The Network Component Perspective also serves as a framework for the development of additional network statistics and measures not field-tested during this project.

Conceptualization of these components will depend on the particular circumstances of the individual library. The Network Component Model (Bertot and McClure, 1998) serves as a framework for such a conceptualization (see Figure 1.2):

- *Extensiveness*: How much service the library provides (e.g., number of users accessing a Web page per week, number of database sessions);
- *Efficiency*: The use of resources in providing or accessing networked information services (e.g., cost per session in providing access to remote users of an online database, average number of times users are unable to successfully connect to the library's servers);
- *Effectiveness*: How well the networked information service meets the objectives of the provider or the user (e.g., success rate of identifying and accessing the information needed by the user);
- *Service quality*: How well a service or activity is done (e.g., percentage of transactions in which users acquire the information they need);
- *Impact*: How a service made a difference in some other activity or situation (e.g., the degree to which network users enhanced their ability to gain employment or pursue business);
- *Usefulness*: The degree to which the services are useful or appropriate for individual users (e.g., percentage of services of interest to different types of user audiences);
- *Adoption*: The extent to which institutions or users integrate and adopt electronic networked resources or services into organizational or individual activities (e.g., answering reference questions, generating inter-library loan requests, use of digital collections).

Figure 1.2 The Network Component Model

Network Component	Network Evaluation Criteria						
	Extensiveness	Efficiency	Effectiveness	Service Quality	Impact	Usefulness	Adoption
Technical Infrastructure							
Information Content							
Information Services							
Support							
Management							

It may not be necessary to develop measures that address every evaluation criteria for every network component. Instead, the matrix serves as an organizational tool for evaluating possible measures that an individual library will need to assess its outcomes of interest. These types of criteria provide an important roadmap for thinking about the type of data element and statistics that would be necessary to produce such measures, as well as providing a quality measurement framework for library networked services and resources.

1.3.2 USING THE NETWORK STATISTICS

The recommended network statistics and performance measures, either independently or in some combination, can assist research libraries in describing a number of aspects of their networked resources and services. This section provides libraries with some guidance regarding the use to which the statistics and measures can be put.

Although the statistics and measures presented in this manual fall under a number of network components, it is possible to categorize broadly the statistics and measures into statistics and measures that identify:

1. The overall size/volume of available networked resources;
2. The extent to which the networked resources and services are used by the library's service population;
3. The cost to the library of providing the networked resources to its service population.

1.3.2.1 SIZE AND VOLUME OF NETWORKED RESOURCES

As Figure 1.3 indicates, several statistics and measures allow libraries to identify the extensiveness of their networked resource collections. By collecting and reporting the recommended statistics, libraries are able to identify their total number of:

- Journals available electronically in full-text format (e-journals);
- Reference sources available electronically to staff and patrons;
- Books available electronically (e-books);
- Items digitized from the library's own collection (e.g., documents digitized and mounted through a network accessible method).

Also, by combining R3 (Number of electronic books) with a count of library print monographs, libraries can calculate the overall percentage of books available in electronic format to the populations that they serve (P3).

Figure 1.3 Network Resources Size and Volume Statistics and Measures

R1	Number of electronic full-text journals
R2	Number of electronic reference sources
R3	Number of electronic books
D1	Size of library digital collection
P3	Percentage of electronic books to all monographs

1.3.2.2 EXTENT OF USE OF NETWORKED RESOURCES AND SERVICES

A number of statistics and measures allow libraries to determine the overall use of their networked resources and services (see Figure 1.4). In particular, statistics enable libraries to identify the overall:

- Number of sessions conducted with library database subscription services, with a number of sub-categories if desired (e.g., location, per title, etc.);
- Number of queries posed by users of the database subscription services, with a number of sub-categories if desired (e.g., location, per title, etc.);
- Number of items requested (e.g., printed, e-mailed, saved, or otherwise accessed) by users of the database subscription services, with a number of sub-categories if desired (e.g., location, per title, etc.);
- Number of visits to library-maintained virtual resources (e.g., web pages), with a number of sub-categories if desired (e.g., location – remote v. in-library);
- Number of accesses and queries made by library service users of library-maintained virtual resources, with a number of sub-categories if desired (e.g., location – remote v. in-library);
- Number of electronic reference transactions conducted.

By considering the U1 (Number of electronic reference transactions) and U5 (Virtual visits) network statistics and traditional statistics of reference transactions and library visitors, libraries can gain a sense of the ratio of electronic reference to total reference transactions, as well as the ratio of virtual (remote) library visits to physical library visits. These provide important trend indicators for the use of selected networked library resources and services.

Figure 1.4 Extent of Use of Networked Resources and Services Statistics and Measures

U1	Number of electronic reference transactions
U2	Number of logins (sessions) to electronic databases
U3	Number of queries (searches) in electronic databases
U4	Items requested in electronic databases
U5	Virtual visits
D2	Use of library digital collection
P1	Percentage of electronic reference transactions of total reference
P2	Percentage of virtual library visits of all library visits

1.3.2.3 LIBRARY NETWORK RESOURCES AND SERVICES COSTS

The statistics summarized in Figure 1.5 enable research libraries to identify and explore a number of costs associated with developing, acquiring, and managing library networked resources and services. In particular, the statistics provide libraries with cost data that:

- Determine the cost of subscribing to and/or purchasing online full-text journals;
- Determine the cost of subscribing to and/or purchasing online reference sources;
- Determine the cost of subscribing to electronic books (e-books);
- Identify library expenditures for online material provided through participation in local, regional, and/or national consortia *not* included in database subscription services;
- Identify the expenditures of non-library entities (e.g., state-wide resources provided through consortia or governmental agencies) on behalf of libraries for subscription services;
- Identify the costs associated with library digitization activities, including equipment, software, contracted services, personnel, etc.

As a whole, the cost statistics provide research libraries with data that describe some of the direct costs associated with providing networked resources and services to the communities they serve.

Figure 1. 5 Library Networked Resources and Services Cost Statistics and Measures

C1	Cost of electronic full-text journals
C2	Cost of electronic reference sources
C3	Cost of electronic books
C4	Library expenditures for bibliographic utilities, networks, and consortia
C5	External expenditures for bibliographic utilities, networks, and consortia
D3	Cost of digital collection construction and management

1.3.2.4 COMBINING THE RECOMMENDED STATISTICS AND PERFORMANCE MEASURES

While it is possible to collect and use the statistics independently, it is in the combination of the statistics that libraries can derive the most benefit in terms of understanding the breadth, depth, and uses of their networked resources and services. As an example, take the following statistics:

- R1 – Number of electronic full-text journals;
- U2 – Number of logins (sessions) to electronic databases;
- U3 – Number of queries (searches) to electronic databases;
- U4 – Number of items requested in electronic databases;
- C1 – Cost of electronic full-text journals.

By collecting all five (5) of the statistics and viewing the results in combination, libraries can begin to develop a comprehensive view of their online subscription services. More specifically, libraries would know:

- How many full-text journals are available to library users;
- How many times users access the online journals;

- How many searches users conduct while using the online journals;
- How many articles users view (broadly defined to include viewing, printing, saving, or other action) from the journal; and
- What it costs the library to provide users with access to full-text journal services.

Together these statistics serve as indicators that can facilitate such library resource allocation decisions as:

- Given the overall use of online full-text journals, does the library need to augment and/or modify its subscription services?
- Given the overall cost of full-text subscription services, does the aggregate use of these services justify the expenditure when compared with other library collection and resource expenditures?
- Are there discernable usage patterns that would indicate additional resource needs, in terms of content areas, time of use, frequency of use, and user training needs?
- Does the library hold material related to its users' needs that the library could digitize, organize, and make available (for example, creating finding aids, digitizing unique materials, etc.)?

Used in this way, these statistics provide libraries with the ability to review online full-text subscription expenditures given the overall and specific uses by the communities served.

1.3.3 ISSUES RELATED TO STATISTICS AND PERFORMANCE MEASURES

A review of the issues and perspectives surrounding statistics and performance measures point to a number of considerations for libraries:

- *Library culture of assessment*: In addition to having a systematic approach to network statistics and performance measure activities, libraries need to adopt an overall culture of assessment. Lakos defines a culture of assessment as (1999, p. 5):

  > The attitudinal or institutional changes that have to occur in order for library staff to be able to work in an environment where decisions are based on facts, research and analysis, and services are planned and delivered in order to maximize positive outcomes and impacts for the library clients.

  As such, libraries need to focus on a systematic approach to the assessment of library services, resources, and initiatives in order to better understand the impact of those services, resources, and initiatives as well as to undertake changes and/or modifications to best meet the needs of library users. While several participating libraries undertake a number of assessment activities, they are not, in general, part of a systematic evaluation and assessment process that permeates the library. It is within such an assessment framework that network statistics and performance measurement activities need to reside.

- *Library data collection, analysis, and presentation management system:* The field test, and various research activities throughout the project, demonstrated that libraries overall do not engage in a systematic and focused data collection system. Few, if any, have staff specifically responsible for library-wide data collection, analysis, or reporting and presentation efforts. Moreover, library staff may not be trained appropriately in the various methodologies, data analysis techniques, and reporting procedures required to engage in statistical and performance measurement activities. The data collection situation is particularly problematic in the networked environment, as data collection efforts in this area require additional technical and research skills.

- *Library staff development and training*: Given the culture of assessment issue, combined with a general lack of systematic network statistics and performance measurement activities in participating libraries, it is clear that there is a need for staff development and training in both assessment and network statistics activities. This training should incorporate an overview of the benefits and impacts of evaluation activities; the value of evaluation in decision-making and resource allocation processes; network statistics and performance measure definitions, collection activities, methodologies, and reporting systems; and the incorporation of findings regarding network statistics and measures into decision-making and resource allocation activities.

- *Network planning and evaluation activities as part of a larger context*: The perspective presented in Figure 1.1 of this section demonstrates clearly that research library network activities reside in a larger organizational context. Despite varying local factors, it is important to consider the planning and evaluation of library networked resources and services as part of larger organizational planning and evaluation activities. For example, the decision to subscribe to various online databases needs to occur in the larger context regarding library collection development efforts.

- *Development of multi-agency reporting systems*: It is clear that libraries do not control the use data for all networked services and resources. This is clearly demonstrated by online database vendor statistics. Libraries that receive networked services and resources from other entities such as state library agencies or regional consortia, however, also need to work with those administrative entities for usage reports as well to get a better sense of the overall use of, for example, database services from a research library perspective. In such cases, usage reports will go from the vendor directly to the subscribing entity – not necessarily all the participating members. Thus, there is a need to develop a reporting structure that goes beyond the research library in such cases. It is also necessary to construct agreements to encourage individual library statistics and work with consortia groups to generate meaningful reports for members, etc.

- *Investment and/or modifications in infrastructure*: Network statistics and performance measures are dependent on the information technology (IT) architecture of a library, consortia, vendor, or other service provider from which the library derives service. If a library finds certain statistics of interest and/or importance, it may require investment in an IT infrastructure that enables the collection of such statistics. That investment may require IT and library staff training in order to understand the configuration as well as the statistics enabled through such a configuration.

- *Relationship of network statistics to ARL statistics at large*: This study focused on network statistics and performance measure for ARL libraries. It did not consider the larger ARL statistics and data collection context. It is clear, however, that there is a relationship between this project and the ARL statistics program in general. Indeed, it is possible to consider performance measures that combine currently collected ARL statistics (e.g., volumes) and proposed network statistics (e.g., R3 – Number of electronic books). While the combining of traditional and network statistics requires additional exploration, ARL and ARL members will need to consider how the proposed network statistics fit into the larger ARL statistics program.

- *Relationship of network statistics to other ARL research initiatives and activities*: Although not explored fully by the study team to date, it is important to consider the relationship that the proposed network statistics and other ARL research assessment and evaluation initiatives may hold. Consider the network statistics and the LibQUAL+™ initiative. It is conceivable that a library could engage in a combined assessment program with the network statistics, which serve to describe the use and uses of particular networked services, and LibQUAL+™, which serves to explore user satisfaction with those services. For example, libraries could collect and analyze the uses of their online database services (sessions, searches, items requested). Simultaneously, libraries could administer a user-based survey to users of the database services and explore their satisfaction with those services in general (or a particular one). Together, these assessment efforts would provide libraries with detailed use and satisfaction data regarding a library's online database services.

- *Relationship of network statistics to other data collection activities*: With the number of initiatives in the library network statistics area identified in section 1.4.1 of this report, it is likely that many library statistics programs and data collection efforts will review and incorporate network statistics into the existing data collection and reporting systems. For example, the State Library Agency survey—reported and conducted by the National Center for Education Statistics (NCES) —will begin reporting online database usage statistics as defined by Bertot, McClure, and Ryan (2001) with their 2002 survey. The public library community, again through annual surveys conducted in cooperation with state library agencies, the U.S. National Commission on Libraries and Information Science, and NCES, are reviewing what network statistics to collect. More importantly, through NCES, the Integrated Postsecondary Education Data System (IPEDS) collects several statistics regarding academic library holdings. Under consideration now are what network statistics to collect through that survey. In an environment full of consortia and multi-type network resource and service sharing —particularly with respect to online database services—it is important to consider what network statistics are common across libraries in order to foster comparability and reduce data collection burdens faced by reporting institutions.

These issues point to the need for additional research and testing of a measurement framework for network resources and services, as well as the relationship of the network statistics to other research initiatives. The perspective presented in Figure 1.1 serves as a beginning point for such a framework. The issues raised also indicate a need for libraries to enhance technical, evaluation, planning, and methodological skills among librarians to better understand evaluation activities in general and the networked environment in particular.

1.4 OUTCOMES

It is not enough simply to develop measures and collect statistics related to library networked resources and services. Indeed, as state legislatures increasingly tie budgets to performance and regional accreditation boards begin emphasizing the need to articulate outcomes, it is important for research libraries to decide what their outcomes should be and to determine how to connect measures and statistics to these outcomes. An important component of this project involves developing a graphical model that ultimately links proposed network statistics and measures to: (1) educational, research, and service outcomes in higher education institutions; and (2) educational, research, and service outcomes in higher education libraries. For "outcome" we have used the following as a working definition:

> a clearly identified result or end product that occurs as a consequence of individual or combined activities from units at the institution. These outcomes are a preferred or desired state and clarify specific expectations of what *should* be products from the institution. An institutional outcome can be defined and measured in such a way that evidence is available to determine the amount or degree to which the outcome does, in fact, occur.

As part of the overall project, the study team has undertaken a number of outcomes-related activities to date.

1.4.1 OVERVIEW OF OUTCOMES FOCUS

1.4.1.1 REVIEW OF OUTCOMES-RELATED PROJECT TEAM EFFORTS TO DATE

During Phase II of the E-Metrics project (November 2000 – June 2001), the study team was engaged in an extensive, ongoing effort to develop frameworks for understanding and graphical models for depicting measurable library inputs and outputs in the context of indicators of institutional outcomes.

This process began with a review of literature concerning library and institutional assessment to better understand what work and thinking had been done, with an eye toward finding documented linkages between library outputs and institutional outcomes. We found that, while the problem was clearly defined and its significance well appreciated and often noted in the literature, there has been little work toward identifying linkages and developing models that ARL member libraries could use to determine how to best measure their impact on the outcomes of the universities they support.

Our earlier *Discussion Paper: Towards a Framework of Library and Institutional Outcomes,* dated and distributed April 4, 2001 [available at http://www.ii.fsu.edu/Projects/ARL/Docs/ARL.Outcomes.Disc.Paper.CNI.April4C.2001.doc], includes a literature review and highlights some of the key work identified in the area of outcomes assessment. From the insights gained, in addition to prior work in this area by the team, we conducted selective structured interviews to begin the process of:

1. identifying key work and actors in the field;
2. grounding our framework development in (a) the activities already underway, and (b) the concerns of representative participants.

In addition, the study team has been and is engaging in a multi-method approach that creates many access points to the complex issues at hand, including:

- Content analysis of ARL member institution strategic planning documents;
- A survey of ARL deans and directors;
- Discussion forums;
- Site visits;
- Policy analyses;
- Case studies.

Ongoing content analysis of surveys, interviews, and strategic planning documents provided to us by survey respondents and others has begun to reveal commonalities in the institutional goals of ARL members and the manner in which those goals are devised and articulated. Synthesis of these documents has informed the refinement of our model by suggesting a set of key processes that ARL deans and directors can employ to ensure their libraries are having the desired outcomes and that they are able to measure them successfully. The study team has conducted site visits that furthered our understanding of the cultural context in which outcomes assessment must take place, and provided an opportunity for model testing and refinement.

Upon completion, we hope to have a framework and model that are valid for the ARL community and that can be built upon in future research. A proposal for external funding of such research will be written by the study team so that the contribution the library makes to the institution it serves can be better measured, articulated, and enhanced.

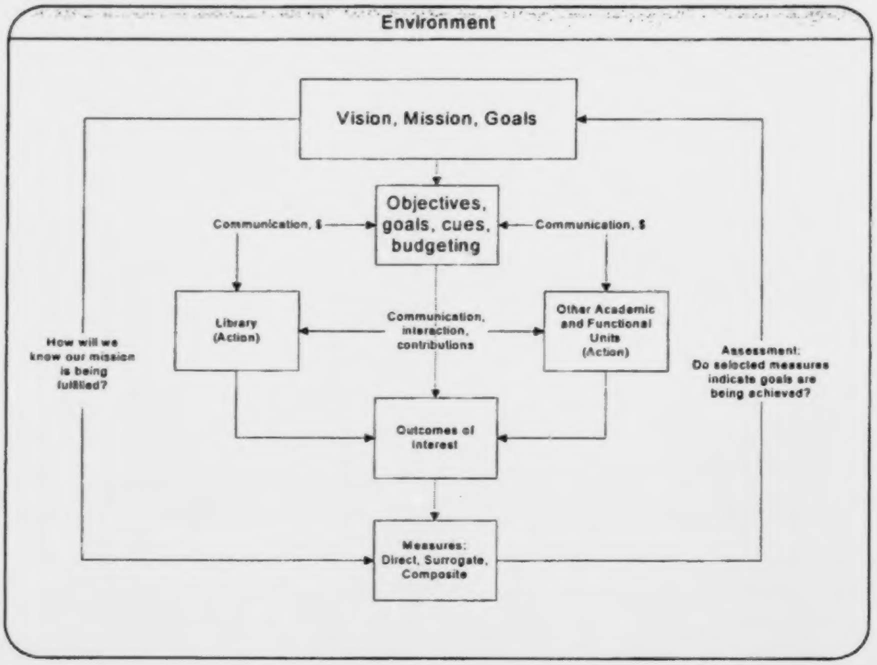
1.4.1.2 DEVELOPMENT OF AN OUTCOMES MODEL

Lindauer's (1998) "Defining and Measuring the Library's Impact on Campuswide Outcomes," particularly informed the graphical model presented in this project's Discussion Paper. In this article, Lindauer describes five assessment domains for libraries and connects goals of the university with activities and measures within the library. Our graphical model began to depict the process by which an academic research library helps meet the goals of particular departments and functional units within a university, which in turn contribute to institutional goals, while acknowledging that libraries may also contribute more directly.

Our research efforts—particularly site visits, structured interviews, and strategic planning document content analysis—have demonstrated the need for libraries to approach measuring outcomes differently than measuring inputs and outputs. The current graphical model (Figure 1.6) shows the manner in which library deans and directors must be cognizant of the objectives and goals of the university, other academic and functional units, and the unique and changing legislative, accreditation, and technological environments in which universities operate.

While the graphical model does not show how *particular* services and resources contribute to outcomes, it does describe how a library dean or director can begin thinking about targeting library services toward the outcomes of interest to the university, and measure their contributions and impacts more effectively. Linking measures to outcomes cannot be done without first considering what outcomes are desired and what effects achieving those outcomes could have.

Figure 1.6 Outcomes Model


Environment
Vision, Mission, Goals
Objectives, goals, cues, budgeting
Communication, $
Communication, $
Library (Action)
Communication, interaction, contributions
Other Academic and Functional Units (Action)
How will we know our mission is being fulfilled?
Assessment: Do selected measures indicate goals are being achieved?
Outcomes of interest
Measures: Direct, Surrogate, Composite

1.4.2 Relationship between Outcomes and Measurements

1.4.2.1 A Change in Perspective

University research libraries are established to support the broad research, education, and service goals that are fundamental to the mission of the institutions they serve. Beyond helping to fulfill the university mission, a research library must be able to help the larger institution reach its more concrete but shifting goals. These goals may be articulated in strategic planning documents, in conversations with the provost or academic deans, in fulfilling regional accreditation standards, or in state legislation.

It is important to be highly aware of these goals and to be able to target library resources, services, and programs to help meet institutional goals. Doing so is critical to the university research library being seen as a vital, contributing part of the university. To address these goals and measure them effectively, it is important to ask three key questions:

1. What is the desired state of the university?
2. How can the library help the university achieve this state?
3. How will the library know when it has been successful in helping the library achieve this state?

The first question helps the library better understand its operating environment. Knowing what the university wants to be now and in the future helps library administrators understand what customers need.

The second question helps in making decisions about which of the many goals of the university are helpful for the library to focus on. Also, answering this question helps the library make decisions about what action it must take to contribute to the fulfillment of those goals. Existing services and programs may address them, programs may have to be fine-tuned and resources upgraded, or new programs and resources may need to be developed and acquired.

The third question helps the library craft the measures that will provide indications of success. This is extremely important and must be thought about carefully because direct outcomes measurement is often difficult or impossible. It may be necessary to develop several measures that work together to indicate an outcome state or to use surrogate measures such as perception surveys. One framework for developing such measures is described below.

The order in which these questions are addressed is also vital. Before measurements can be derived, library administrators must know what they want to measure and how the library's impact is likely to occur. Without this perspective and focus, outcomes measurement cannot be targeted and loses meaning. In other words, it is very difficult to gain useful insights about outcomes when measures are not designed with outcomes explicitly in mind.

ARL libraries may currently collect measures that can provide some indication of success of a particular program or service provided to customers, such as user satisfaction surveys; however, it is important to think broadly—with the desired state in mind—and not simply use the measures on hand because they are easy to collect or because a lot of time and effort has been devoted to collecting them.

In most cases, a single measure on its own is not enough to indicate whether a research library is successful in a given area. To accurately assess the success or quality of an academic library, measurement should be implemented at three key levels:

- Outcome Level;
- Use/Capacity Level (Output);
- Resource level (Input).

Figure 1.7 Using Measures to Answer Questions at Different Levels

Outcome Level	Use/Capacity Level (Output Measures)	Resource Level (Input Measures)
What are the results of a program or process?	How much is a service, resource, or program being used?	What do we need to ensure success?
How successful or effective is the library?	Who is using a service, resource, or program?	What funding level is appropriate or necessary for a particular program?
How effective do customers perceive your programs to be?	Why are people using a particular program?	Do we need more of a particular resource in order to have a more effective program?
What beneficial effects are you having on your customers?		
How could a program be changed to better suit the needs of your customers?		

The following example illustrates this approach:

> Imagine that information literacy is a theme for your university. How can you have a meaningful impact in this area? One way might be an

> effective bibliographic instruction program that reaches many students. Ask the question, "What would constitute success for our BI program?" Once you have articulated the answer, you can begin to develop measures for the effectiveness of your BI program (i.e., professor perception of student performance before and after BI program, etc.)

It is also important to know how many students can be reached with the program, so capacity and use measures are needed as well. Because the program needs staff and materials created, it is important to have resource measures that indicate what goes into the program and whether more or different resources make a difference in the effectiveness or success of your program.

An example in the networked context is the following:

> Imagine that your university wants to attract a "world class faculty." There are many ways that the library can have an impact in this area. Capitalizing on resources unique to your university is one way to "brand" your library (and in turn university) as having expertise in a particular field (or many fields). By digitizing collections and making them widely available, the library can attract scholars all over the world to these materials. As a result, scholars will begin to associate these unique resources with your university and may even be attracted to your faculty. There are many ways to measure whether or to what extent there is a linkage. For instance, you could survey new faculty members and ask if they used your library's materials prior to coming on board, which materials they used and for what, and whether this influenced their decision to join the faculty.

In this example, it is important to know who is accessing the collection, and which parts of the collection they are using most often. This can indicate which parts the digital collection users are most interested in and what collections may need to be more fully developed. Additionally, it would be helpful to know what resources are devoted to creating this digital collection, and if increasing, changing, or upgrading resources has an impact on the desired outcome.

Following this approach, however, may lead to the formulation of a wide range of performance measures and statistics. Selection of the precise measures needed to evaluate an electronic resource or service can be especially difficult, even for libraries that have undertaken processes similar to those described above. Therefore, it is important to have a framework to assist in choosing measures to gain insights into the use and uses, management, and reach of networked services and resources in specific areas or across a number of areas.

1.4.2.2 IMPORTANCE OF DEVELOPING OUTCOMES PROCESSES

As discussed in the preceding section, ARL libraries need to develop a process to identify and operationalize library outcomes that contribute to institutional outcomes. The library must play a major role in informing the university of valued institutional outcomes to which the library contributes. Setting up such a process is an important method for informing key stakeholders in the university of both the library's role in institutional outcomes and insuring that the institutional outcomes to which the library has (or may have) links are in fact appropriate.

Because each university has different processes for information sharing, decision-making, and mission fulfillment, it is important that each university library identify, understand, and master the established local process. It is a given that libraries must work within their particular organizational framework. Therefore, to maximize contributions to university outcomes, the library must orient itself within and operate with the fullest advantages of that local framework.

An important factor that contributes to an effective understanding of the local situation is sensitivity to the differing points of view of various stakeholder groups. What might constitute institutional outcomes, or appropriate institutional outcomes, will vary from one group to another (deans, faculty, trustees, students, etc.). It may be that the outcomes from the library (as agreed-upon by library staff and administration) may or may not be those seen by university administration as important or appropriate. Developing a process to address these potentially conflicting stakeholder concerns at the local level is particularly vital.

1.4.3 STATISTICS AND PERFORMANCE MEASURES

1.4.3.1 Why measure?

In general, statistics and performance measures can inform decision-makers at many levels in the research library organization. At one end of the spectrum, they can support the wide array of internal operations; at the other end they can provide insights on the broader role played by the library in its institutional and community setting. More specifically, they give administrators the tools to know how effectively they provide resources and services to customers, how their customers perceive their effectiveness, and how well they are doing as compared to peer institutions.

1.4.3.2 WHY MEASURE NETWORKED SERVICES?

Although libraries have changed significantly in response to electronic and networked services, the ARL membership criteria index does not currently contain measures that pertain to all of these services and document the substantial amount of time and money involved. It does, however, include measures that address electronic resources and services as part of the larger whole. Specifically, *serials* include electronic journals and *total expenditures* includes costs for electronic services. "Striking the right balance between measuring the continuing and the emerging realities of the modern research library is at the cornerstone of the ARL Statistics and Measurement Program operations. Research libraries' traditional realities drive the ARL measures of printed collections, budgets, and staffing. The emerging realities drive ARL's agenda to seek credible indicators of steady growth and high demand for the complex mix of new services, consortial arrangements, electronic information, the influence of the Internet, and the ways in which students and faculty interact with each other and these newer channels of information" (Kyrillidou & Crowe, 1998).

1.4.3.3 E-METRICS

Overall, the network statistics and measures described in the following manual were developed, refined, and tested to help *describe* what is happening internally in research libraries and do not measure outcomes directly. They may, however, serve as indicators of outcomes or point to areas where outcomes measures could be focused. Each of the five types of statistics/measures can be helpful in a variety of ways.

1.4.3.3.1 Resource Measures

The current ARL membership criteria index does not include separate measures for electronic and networked monographs, serials, and bibliographic utilities, but does include some of them with their traditional analogs. However, to be able to assess the relative cost and benefits of materials in different formats, as well as for the reasons pointed out in Section 1.3.4.2, decoupling the measures for electronic and traditional materials may be necessary.

Although the same can be said of much of what is on the Internet, electronic and networked resources provide scholarly and other materials that most users of the Internet cannot get on their own and thus contribute to the value of the research library. The number can also be benchmarked against other institutions and used to show where academic research libraries are in terms of providing the most anytime-anywhere access to scholarly materials.

1.4.3.3.2 Use Measures

High use of a library resource or service implies a collection development program that is working to create access to the resources customers need. Use measurements can also identify resources and services that are seen as particularly valuable in the education and research enterprise and should be expanded, or perhaps resources and services that should be discontinued due to lack of use and interest. Whether provided by vendors or collected internally, usage statistics can help a library administrator make decisions and plan for the future. Looking at the reported data can also provide other information as well, such as where and when people use materials, thus informing the library if it is truly providing anytime-anywhere access. Providing this access is expensive and can drain funds away from traditional access. The E-Metrics use measures put this in the perspective of the changing research library.

1.4.3.3.3 Cost Measures

These measures were developed for ARL to understand what libraries were spending on electronic and networked resources because "expenditures for electronic resources confirmed that existing data [was] neither comprehensive nor comparable from one library to another" (Blixrud & Jewell, 1998). These measures can help ARL libraries answer questions posed to them by university administration as they increasingly need to justify their growing budgetary needs due to the great expense of electronic and networked services.

1.4.3.3.4 Digital Collection Measures

While comprised of resource and user measures, the digital collection measures attempt to describe where libraries are in creating and making available local, possibly unique content that may not have been previously network accessible. These collections are important—and in some cases vital—for users, and help to brand the university and its library when the higher educational and scholarly community uses them and notes their origin. This can attract students and faculty to your university as well as adding to the world's networked knowledge. As more libraries do this, more users will be able to get specific, unique resources anytime and from anywhere. Collecting these measures and storing them centrally provides an opportunity for benchmarking and may encourage libraries to devote more time and resources to this worthwhile endeavor.

1.4.3.3.5 Performance Measures

Performance measures are useful to libraries in decision-making pertaining to resource allocation, service offerings, collection development, and budgeting. The E-Metrics performance measures are intended to help libraries know and describe where they are with providing electronic networked services and resources, as compared with traditional services and resources in order to "describe the transformations underway" (Kyrillidou & Crowe, 1998).

There is also a need to know about the trends across institutions. "The challenge, then, is not describing any single change, but rather to develop quantifiable trend analysis in multiple institutions that can be executed from year to year in a consistent way" (Kyrillidou & Crowe, 1998).

1.4.4 ONGOING EFFORTS

As part of the ongoing focus on outcomes, the study team is developing a revised version of the April 2001 *Discussion Paper*, scheduled to be completed in fall 2001. Included in this revision will be an analysis of the study team's survey of ARL deans and directors related to institutional outcomes. Other aspects of this ongoing effort follow.

1.4.4.1 THE ROLE OF REGIONAL ACCREDITATION STANDARDS

The study team engaged the services of Bonnie Gratch-Lindauer to follow up on some of her previous work (Lindauer, 1998), and conduct a review of relevant accreditation standards as they relate to outcomes and networked services. Her summary observations from that review are as follows:

1. The majority of these outcomes and outcomes-related statements that refer to libraries and information resources are located in sections of the standards that deal with the education program and institutional effectiveness.
2. The use of library and information resources is connected to student learning outcomes in four of the documents, and evidence, such as inclusion in course syllabi and integration of library use into the undergraduate curriculum, are offered as measurable indicators for assessment purposes in two of the documents.
3. The university library's role in helping students develop information literacy skills is an important student learning outcome referenced in four of the documents and in the "Best Practices for Electronically Offered Degree and Certificate Programs," endorsed by the accrediting commissions.
4. Assessing student needs, perceptions and levels of satisfaction with educational support services (i.e., library and information services) and demonstrating that the findings from these user studies are used for program improvement are fundamental expectations of all the regional accrediting commissions.
5. Appraisal of annual institutional goals and progress in their accomplishment is suggested as a type of evidence contributing to institutional outcomes, or in some of the documents the phrase used is "institutional effectiveness."
6. All of the standards describe the need for institutions to have an assessment or evaluation plan and to document that the findings are utilized for program improvement. Some of the documents clarify this requirement to mean that each program or unit should have an assessment plan.

7. Several of the documents refer to the campus climate or the institutional environment that supports teaching and learning. Three specifically connect library and information resources and services to the quality of the learning environment. The implication is that university libraries should clearly describe what resources and services they provide that directly support the learning environment, how these are used and with what effects on students and faculty.

Her findings will be further incorporated into the next version of our *Discussion Paper* to help illustrate: (1) the need for research university libraries to demonstrate the outcomes of electronic and networked services; (2) the need for such libraries to demonstrate any outcomes apart from electronic and networked services; and (3) the need for research universities to show the connection between the use of electronic and networked services and the fulfillment of their missions

1.4.4.2 OTHER OUTCOMES-RELATED RESEARCH

The study team has also been reviewing the work done by Ken Smith and Doug Jones, who are studying education and research outcomes for university libraries, respectively (http://www.arl.org/stats/newmeas/outcomes/heo.html). It is hoped that their work will help us better understand the role electronic and networked services play in these areas. In addition, the work being done to study user perceptions of quality in the LibQUAL+™ program has been of interest and is being explored for possible connections (http://www.arl.org/libqual/).

The study team is also investigating the work done outside of ARL's New Measures Initiative. One interesting study of the library's impact on sponsored research funding conducted by Brinley Franklin, Director of Library Services, University of Connecticut Libraries, and Consulting Associate, KPMG Consulting, LLC, found that "electronic services use supporting sponsored research generally mirrored the same level of support exhibited by the general use of library materials and services at almost all types of libraries". Franklin also found "a high correlation between total research and development funding at an educational institution and total library expenditures at research universities". This work suggests that electronic services use be quantified to reflect the degree to which a library's investment in electronic services supports specific institutional outcomes.

It is hoped that the work described above will help us better understand the role library networked services have in supporting research, education, and service outcomes at a variety of ARL member institutions.

1.4.4.3 Proposal for Future REsearch

The study team has begun thinking about how best to move forward beyond the scope of this project and plans to release a proposal for such work in December 2001. In the past, it has been said that understanding outcomes will require much research and indeed this is consistent with the study team's findings. "In the long run, if higher education wants to measure library 'impact' we will need to initiate longitudinal studies, for example, by questioning and tracking individuals from grades K-12 through their undergraduate/graduate study and as alumni in order to assess how their lives have been affected by their library experience" (Kyrillidou & Crowe, 1998)

1.5 RELATED EFFORTS

This section reviews briefly additional research initiatives related to network statistics and performance measurement as well as outcomes-based research in the higher education environment. In particular, the section identifies and describes selected initiatives that explore the development and implementation of network statistics and performance measures across library types as well as initiatives that attempt to link the research library to institutional goal and objective attainment.

1.5.1. NETWORK STATISTICS AND PERFORMANCE MEASURE INITIATIVES

Interest in the development and implementation of network statistics and performance measures has risen steadily over the last three years in a number of library settings. It is not surprising, therefore, that a number of library-based organizations, researchers, publishers, and database aggregators pursue increasingly the ability to measure network activities in libraries. Below is a selective list of major initiatives, other than the ARL project on which this document reports, active in the area of library network statistics and performance measure development:

- *Institute of Museum and Library Services, National Commission on Libraries and Information Science, National Information Standards Organization*: Along with some of the project study team members, these organizations are working together on a number of initiatives that include the development and adoption of network statistics for U.S. public libraries, the development and implementation of a national data collection model for U.S. public library network statistics (see http://www.ii.fsu.edu for additional information), the adoption of standard terminology, definitions, and reporting of database vendor statistics (see http://www.nclis.gov for additional information), the revision of U.S. library statistics standards (NISO Z39.7, see http://www.niso.org for additional information) to include network statistics and performance measures, and the adoption of international standards for both library statistics in general and network statistics in particular (see below for a description of the International Standards Organization initiative).
- *International Coalition of Library Consortia (ICOLC)*: ICOLC is an international coalition of predominantly academic libraries (some of which are sponsors of the ARL E-Metrics project) interested in pursuing standard network statistics and reporting systems regarding database vendor data. ICOLC first published its proposed standards and definitions in November 1998 and is currently considering revisions to those standards. Additional information on the ICOLC initiative is available at http://www.library.yale.edu/consortia/webstats.html.
- *International Standards Organization (ISO)*: Through the ISO Technical Committee 46 (Information and Documentation), subcommittee 08 (Statistics and Performance Evaluation) members of ISO have been revising both general library statistic standards and incorporating network statistics and performance measures into the statistical data collection efforts of participating libraries (multi-type). As of July 2001, the U.S., through NISO, rejoined the ISO effort after a one-year absence. A member of the study team (Bertot) serves as one of the U.S. delegates, as well as an ARL library director (Heath). Recent balloting efforts resulted in the passage of the proposed ISO library statistics (document ISO/DIS 2789) although a number of voting members provided substantial comments on the statistics. A meeting will occur in late August 2001 to begin resolving the issues raised by members through their comments. Additional information on this and other ISO efforts are available at http://www.iso.ch/iso/en/ISOOnline.frontpage.
- *European Community-sponsored Equinox project:* The Equinox project focused on developing library performance and quality measures. In particular, the project aimed to further develop existing international agreement on performance measures for libraries for the electronic library environment as well as develop and test an integrated quality management and performance measurement tool for library managers. The project identified a number of performance measures that, in some cases, have been integrated into the ISO library statistics initiative. Additional information on the Equinox project is available at http://equinox.dcu.ie/.

- *LibEcon project*: A European initiative, LibEcon focuses on the collection of economic and other library-related data from predominantly European libraries. For its Millennium Study, the survey incorporated selected network statistics developed by the IMLS study as well as ISO activities. The US is reporting for the first time in 2001. NCLIS is coordinating the data submission effort for the US. Additional information on LibEcon is available at http://www.libecon2000.org/.
- *Council on Library and Information Resources (CLIR) initiative*: CLIR investigated the issues surrounding network statistics primarily from an online database data perspective. The initial study, conducted during 1999 and 2000, resulted in the publication of a white paper entitled *White Paper on Electronic Journal Usage Statistics*. It is the understanding of the study team that the work begun through this effort continues. Additional information on this initiative is available at http://www.clir.org.
- *Publisher and Libraries Solution Committee (PALS)*: This recent initiative, operating through the auspices of the Joint Information Systems Committee (JISC), is exploring the data needs of libraries from publisher provided online usage statistics. A vendor-based usage statistics working group has been developed to explore the issues involved regarding online vendor statistics in a more in-depth fashion. This group met in June 2001 in the United Kingdom to pursue further network statistics needs of libraries from vendors. Study team members are in contact with this group. Additional information on this initiative is available at http://www.jisc.ac.uk/curriss/collab/cb-pub/@wg-mem

These efforts suggest that: (1) There is great interest in the development of library network statistics and performance measures across a wide range of interests, perspectives, and stakeholder groups; (2) The number of efforts provide some idea of the complexity of coordination, cross-fertilization, and duplication of effort currently in progress; and (3) It is possible to identify, define, and institutionalize a number of network statistics and performance measures and attempt to blend these initiatives. The level of effort required to do so, however, is great and beyond the resources of the study team – except in some selective fashion.

1.5.2 ARL NEW MEASURES INITIATIVE

ARL has undertaken a comprehensive New Measures Initiative through which it attempts to capture research library activities and efforts along a number of outcomes-based dimensions. In particular, the initiative focuses on the need to articulate library outcomes in relation to the communities they serve. Moreover, the New Measures initiative stresses the importance for research libraries to decide what their outcomes should be and how to measure them before these issues are decided for them. Thus, in 1994 (Kyrillidou & Crowe, 1998),

> [a] new strategic objective was adopted by the ARL membership to describe and measure "the performance of research libraries and their contributions to teaching, research, scholarship and community service." This action ratified new directions for the ARL Statistics and Measurement Program to expand beyond measures of 'input' (such as collection size, number of staff, expenditures, etc.) and to search for new kinds of measures of library performance and impact.

To this end, ARL later took on the New Measures Initiative, which is comprised of the E-Metrics, LibQUAL+™, Research Outcomes, and Educational Outcomes projects, among others.

The idea of the New Measures Initiative is to identify the contribution that the research library makes to its service community along a number of fronts, of which a select few are described below (see http://www.arl.org/stats/newmeas/newmeas.html for additional detail on the New Measures Initiative):

- *LibQUAL+™*: This research demonstration project seeks to define and measure library service quality across institutions and to create useful quality-assessment tools for local planning. The goals of LibQUAL+™ are to 1) establish a library service quality assessment program at ARL; 2) Develop web-based tools for assessing library service quality; 3) Develop mechanisms and protocols for evaluating libraries; and 4) Identify best practices in providing library service.
- *Educational Outcomes*: This research demonstration project focuses on the role of the academic library in the support of overall institutional goals. In particular, the project seeks to make sense of the new environment research libraries (and their academic institutions) face and understand (1) The changing expectations faced by universities; (2) How universities are responding to these new expectations; (3) How this affects the library's mission; (4) How libraries can develop a strategy to be a central part of the university's response; and (5) How the Association of Research Libraries can assist its members to take on new roles.
- *Research Outcomes*: The research outcomes project is currently underway with an investigation being conducted by Douglas Jones who has been appointed a Visiting Program Officer for the Association of Research Libraries to identify issues and explore possible measures that demonstrate the role of the library in support of the university research mission.
- Other 'new measures' project focus on cost studies (i.e., technical services, interlibrary loan, and staff allocation cost drivers) in ARL libraries.

The E-Metrics project, of which this study is a part, seeks to understand library network activities and ways in which to capture, report, and demonstrate the outcomes of those services and resources.

2 FIELD-TESTING METHODOLOGY AND SUMMARY OF FINDINGS

While the proposed statistics and measures could have been recommended for adoption without testing their feasibility, it was considered prudent to subject these measures to some form of testing. Particularly, in view of the fact that many of the proposed statistics and measures had never been collected in a systematic way, we needed to know (1) whether the statistics and measures could be collected; (2) whether the recommended procedures would facilitate data collection; (3) the estimated time and efforts required to collect data; and (4) the utility of statistics given the amount of time and effort to collect them, among other things. Considerable preparation and effort by participating libraries and the study team went into the field-testing of proposed measures.

This section describes the evolutionary process by which various versions of statistics and measures, as well as field-testing methods and procedures, were refined. It also presents findings related, directly and indirectly, to field-testing results.

2.1 EVOLUTIONARY NATURE OF STATISTICS FOR NETWORKED RESOURCES AND SERVICES

The ARL E-Metrics Project represents the first systematic attempt to develop statistics and measures to describe networked information resources and services at research libraries in North America. It also is an early attempt to standardize key measures and definitions. No doubt the nature and focus of the statistics will evolve as the research library environment, information technologies in particular, changes over time. This section describes the process in which statistics and measures evolved from the initial recommendation to the adoption for the field-testing in the E-Metrics context.

The measures produced from the project are intended for wider adoption by ARL libraries but may not be applicable to all ARL libraries in all situations. It may be necessary to develop additional, more detailed statistics and measures at the individual library level or among a group of libraries sharing similar interests.

2.1.1 INITIAL LIST

Based on the needs assessment study conducted in Phase I of the project, the study team issued the first preliminary statistics in a memo to project participants dated November 27, 2000 (see Figure 2.1). The list of statistics also appeared in the December 2000 issue of the ARL Newsletter (http://www.arl.org/newsltr/213/index.html).

Figure 2.1 Preliminary Statistics and Measures (E-Metrics version 1.0)

STATISTICS

☐ **Electronic Resources and Services**
- Number of electronic full-text journals (hosted by library)
- Number of librarians providing electronic reference
- Virtual visits to networked library resources
- Electronic reference transactions
- Number of public access workstations

☐ **Electronic Databases**
- Number of electronic full-text journals (through subscription)
- Logins (sessions)
- Queries (searches)
- Items examined (viewed, downloaded, emailed, printed)
- Turn-aways (requests exceeded simultaneous user limit)
- Total user connection time to vendor databases

☐ **Instruction**
- Number of people participating in user instruction on electronic resources

☐ **Cost of electronic databases and services**
- Cost of electronic database subscriptions
- Cost of internal digital collection construction
- Cost per items examined (subscribed databases)

MEASURES

- Percentage of electronic reference transactions of total reference
- Percentage of electronic materials use of total library materials use
- Percentage of remote library visits of all library visits
- Ratio of public access workstations to university population (number of faculty, staff, and students)

The list is divided into two major sections: one containing statistics and the other performance measures that can be derived using combinations of individual statistics. The statistics section is further divided into four main categories of resources/services, electronic databases, instruction, and cost. The study team received comments from five libraries, many of them asking for clarifications on the definitions.

2.1.2 REVISED LIST

Based on the comments, the study team modified and released a revised list with brief definitions. The revised list was first introduced during the CNI Fall 2000 Task Force Meeting on December 7, 2000, in San Antonio, Texas, and later sent to project participants on December 14, 2000, as a survey.

Figure 2.2 Revised Statistics and Measures (E-Metrics version 1.1)

STATISTICS

☐ **Patron Accessible Resources**
- Number of electronic full-text journals (hosted by library)
- Number of electronic full-text periodicals (through institutional subscription)
- Number of electronic full-text periodicals (through consortia and other arrangements)
- Number of electronic reference databases (through institutional subscription)
- Number of electronic reference databases (through consortia and other arrangements)
- Number of electronic books
- Number of staff providing electronic reference
- Number of public access workstations

☐ **Use of Electronic Resources and Services**
- Number of logins (sessions) to networked library resources
- Electronic reference transactions
- Number of logins (sessions) to electronic databases
- Queries (searches)
- Total connection time to electronic databases
- Items examined (viewed, downloaded, emailed, printed) to electronic databases
- Turn-aways (requests exceeded simultaneous user limit)

☐ **Instruction**
- Number of people participating in user instruction on electronic resources

☐ **Cost of Electronic Databases and Services**
- Cost of electronic files (one-time/monographic purchase)
- Cost of electronic full-text periodicals subscriptions
- Cost of electronic reference database subscriptions
- Library contribution to consortia for electronic databases
- Cost of internal digital collection construction

MEASURES

- Percentage of electronic reference transactions of total reference
- Percentage of electronic materials use of total library materials use
- Percentage of remote library visits of all library visits
- Percentage of electronic titles to all periodicals
- Percentage of electronic books to all monographs
- Ratio of public access workstations to university population
- Cost per items examined in individually subscribed databases

* (institutional) means through institutional subscription and (consortia) means through consortia subscription.

The key change from the initial list to the revised list was clearer categorization of statistics: infrastructure (resources that can be accessed by users), use of the infrastructure, and the cost to support it. Another change was the inclusion of the ARL supplementary cost statistics with the intention of avoiding duplicated efforts. As a result, the number of statistics increased from 15 in the initial list to 21 in the revised list, and from 4 performance measures to 7.

In the survey of project participants, the study team asked respondents to rate the usefulness of the statistics and measures on a 5-point scale (5 being the most useful) and make comments and suggestions for each proposed statistic and measure. The usefulness rating was intended to give the study team a quick, quantitative measure of any potential problem with statistics and measures.

The study team received a total of 12 responses from 10 institutions. One response came in the form of an overall comment and did not have the usefulness ratings the survey sought. Overall, respondents gave favorable marks to the usefulness of the proposed statistics and measures. The average rating from 11 responses was 4.2 out of 5. There were five responses whose average was 4.5 and above, with a high of 4.9. There were only two responses whose average was below 4.0, with a low of 3.3.

Category-wise, respondents felt most comfortable with statistics related to cost aspects of electronic resources and services and least comfortable with the proposed performance measures. Table 2.1 shows the average usefulness score for 5 categories of revised statistics and measures

Table 2.1 Usefulness rating for revised satistics and measures by category

Category	Usefulness (Average)
Patron accessible resource	4.3
Use of electronic resources and services	4.2
User instruction	4.0
Cost of electronic services and resources	4.6
Performance measures	3.9

Among the statistics associated with patron accessible resources, two statistics—number of staff providing electronic reference and number of public access workstations—were identified as more problematic or less useful. The usefulness rating was 3.5 for both statistics. Among the use statistics, total connection time was the only statistic that garnered a usefulness score under 4.0 with a score of 3.6. Cost of internal digital collection construction was seen as the least useful among cost statistics with a score of 3.9. In the performance measures category, respondents identified percentage of electronic materials use of total library materials use (3.2), ratio of public access workstations to university population (3.7), and cost per items examined in individually subscribed databases (3.9) less useful than other performance measures.

The reasons for low usefulness scores were twofold. It appears that usefulness was interpreted as both practical (that the statistic can be collected) and worthwhile (it tells something or answers a question). There was clearly a sense that many of the statistics and measures, while potentially useful, would be fairly difficult to keep track of.

During the project meeting in conjunction with the ALA Mid-Winter Meeting on January 12, 2001, in Washington, 22 participants from 17 institutions were asked to choose the top five statistics they would like to have. The rankings for the most part agreed with the usefulness scores described above.

2.1.3 FIELD-TESTING LIST

Based on participants' input, the study team drafted a set of statistics and measures for field-testing as listed in Figure 2.3.

Figure 2.3 Statistics and Measures Field Tested (E-Metrics version 2.0)

STATISTICS

- **Patron Accessible Resources**
  - Number of electronic full-text journals (institutional)
  - Number of electronic full-text journals (consortia)
  - Number of electronic reference sources (institutional)
  - Number of electronic reference sources (consortia)
  - Number of electronic books (institutional)
  - Number of electronic books (consortia)
- **Use of Electronic Resources and Services**
  - Number of electronic reference transactions
  - Number of logins (sessions) to electronic databases
  - Number of queries (searches) in electronic databases
  - Items examined in electronic databases
- **Cost of Electronic Databases and Services**
  - Cost of electronic full-text journals
  - Cost of electronic reference sources
  - Cost of electronic books
  - Library expenditures for bib. utilities, networks, and consortia
  - External expenditures for bib. utilities, networks, and consortia
- **Local Digital Collection Statistics**
  - Size of library digital collection
  - Use of library digital collection
  - Cost of digital collection construction and management

MEASURES

- Percentage of electronic reference transactions of total reference
- Percentage of electronic materials use of total library materials use
- Percentage of virtual library visits of all library visits
- Percentage of electronic books to all monographs

The field-testing list contains a separate category for local digital collections, which added two more statistics (size of the local digital collection and use of the collection). In the patron accessible resource category, three main resource types are identified (full-text journals, reference databases, and electronic books) and each divided into institutional and consortia subscriptions. Two statistics were dropped in the resource category—number of public workstations and number of librarians providing electronic reference. In the usage statistics category, the number of statistics was reduced from 7 to 4. Overall, the number of statistics and measures was reduced from 28 in the E-Metrics version 1.1 (revised list) to 22 in version 2.0 (field test list).

Table B.1 (in Appendix B) lists the statistics and measures included in each iteration.

2.1.4 SUMMARY

Through the iterative process the study team was able to propose a set of statistics and measures for field-testing. In each iteration, inputs from project participants were sought and used as guidelines for modification. The process was a combined effort between the members and the study team. Field-testing provided another opportunity to zero in on the feasibility of the statistics and measures. The results of the field-testing and subsequent revision of statistics and measures are described in Section 2.2.

The categories used in classifying statistics and the statistics themselves show that the current effort is still focused on the library input-output framework of performance evaluation. Most noticeable is the attempt to construct statistics and measures of electronic resources and services that are analogous to their print counterparts. The statistics and measures proposed provide for research libraries means of accounting for resources and services delivered through electronic channels, and thus a better view of and justification for the changing face of libraries.

The current effort extends the input-output models of measurement. However, these statistics and measures are essential for future work and for developing new models or frameworks to move toward a more user- and outcome-oriented approach (see Section 1.4 for further discussion). Moreover, these are the statistics that people felt comfortable with, as evidenced in the high usefulness ratings given to these statistics and measures. We described the evolutionary process that took place in developing statistics and measures for electronic resources and services in the context of the ARL E-Metrics Project. We acknowledge that there are forces - technology, market, government regulations, and so on - that affect the development of such statistics and measures. We encourage research libraries to continually engage in validating statistics and measures of these realities and updating them to better reflect the activities and accomplishments of research libraries as a whole or of individual institutions.

2.2 FIELD-TESTING LOGISTICS

Having discussed the developments that led to the selection of statistics and measures for the field-testing in Section 2.1, we need to explain some of the logistics involved.

The ARL E-Metrics participants had several chances to reflect upon and comment on several iterations of the proposed set of statistics and measures that the study team drafted. Also, during the project meeting at the ALA Mid-Winter meeting in Washington, DC (January 12, 2001), attendees had an opportunity to rank the top five statistics among each category (for example, statistics related to patron accessible resources) based on perceived usefulness. The idea was to weed out statistics and measures that were not worthwhile to collect (through averaging usefulness rankings, which is a way of consensus building), and thus narrow the number of measures to be tested. As a result, the total number of measures decreased from 28 to 22.

Regarding the field-testing logistics, the study team presented the following three options:

- All or nothing where a small set of libraries field test all of the proposed statistics;
- Area coverage where a small set of libraries collect the same category of statistics (for example, cost-related measures only); and
- Pick and choose where all libraries choose from a full set of statistics what they would like to field test.

The relative advantages and disadvantages associated with each option are summarized in Table 2.2.

Table 2.2 Comparison of Field-testing Options

Options	Advantages	Disadvantages
All or Nothing	Easy to administer and gather results	Great burden on libraries to use all statistics
Area Coverage	Lesser burden on all libraries	Smaller set of results, hard to adopt by libraries not in the field test
Pick and Choose	Large set of results, easy for libraries to adopt	Hard to administer and analyze results

All of these options were discussed during the project meeting at the ALA Mid-Winter meeting and it was agreed that the participation should be broad enough to warrant meaningful results. It was also agreed that if a library decided to field test, it would field test all of the statistics and measures, so that the results would be more reliable and consistent. The study team made one exception to this: libraries could choose not to field test statistics related to digital library collection since all libraries were not heavily invested (or involved, developed) in digital collection building.

After the meeting, the study team drafted and sent a final set of field-testing statistics and measures with brief definitions to the participants and asked them to indicate first whether they would like to participate in the field-testing and second what level of participation they would like to have (all statistics including digital collection statistics or all statistics excluding digital collection statistics).

A total of 16 libraries decided to participate in the field-testing. Among them, twelve (12) libraries were the ones who were going to test all proposed statistics and measures and the other four (4), all but the library digitization statistics (refer to Table 2.3). A liaison at each institution was identified as a primary contact during the field-testing.

Table 2.3 Field-testing Libraries

Participants (All proposed statistics and measures)	Participants (all but library digitization statistics)
Alberta, Arizona State, Chicago, Cornell, Illinois at Chicago, Maryland, Massachusetts, Nebraska, Pittsburgh, Texas (Austin), Virginia Tech, and NYPL	Auburn, Manitoba, Western Ontario, Yale

While the field-testing libraries and liaisons were being identified, the study team worked on the field-testing instruction manual. Writing the instructions was not an easy process because we needed detailed definitions, examples, and data collection procedures. The field-testing manual was prepared in consultation with many people, within and outside the study team. While the set of instructions was not intended as a complete and fully developed procedural guide, it evolved into a substantial document, with all the forms required for data collection and reporting purposes. The finished instruction manual was sent out to field-testing libraries on March 26, 2001.

We included in the field-testing instructions a self-evaluation form for each statistic and measure in order to understand how the local testing was carried out, what each library learned during the process, and what might be the likely issues if these statistics were to be collected on a regular basis. The form asked the following questions:

1. What was the easiest aspect of collecting the data for this statistic/measure?
2. What was the most difficult aspect of collecting the data for this statistic/measure?
3. Do you have any suggestions and recommendations that would improve the data collection process?
4. Approximately how many staff hours were necessary to produce this statistic/measure?
5. To what degree is this statistic/measure worth collecting given the amount of time and effort required to collect it?

During the field-testing, the study team received numerous questions from library liaisons regarding various aspects of field-testing (e.g., definitions, procedures and use of forms) and provided answers and guidelines according to the field-testing instructions.

2.2.1 SITE VISITS

During the week of April 23, 2001, Wonsik "Jeff" Shim conducted site visits at three field-testing libraries—University of Chicago, University of Illinois at Chicago, and University of Manitoba. Jeff met with library staff members who were involved in the field-testing, answered questions, and collected information related to field-testing procedures.

Both one-on-one interviews with the site liaison and group interviews with key informants were conducted. The visits provided very useful information about the detailed processes that these libraries adopted to complete the field-testing, which otherwise would not have been known.

2.3 SUMMARY OF RESULTS

Three kinds of data sources informed the results summarized in this section:

- Reported statistics and measures
- Self-evaluation comments
- Site visits

Some of the findings made their way into the final data collection manual included in this report and will not be discussed here. We instead focus on the overall management of data collection efforts and lessons learned during field-testing.

Overall, 14 out of 16 libraries were able to compile and report data. Table 2.4 shows the level of participation, at least to the extent that numbers were reported by each library. The names of the libraries are suppressed as the information is not integral for reporting purposes. Note that statistics U2 (number of session in licensed databases), U3 (number of queries), and U4 (number of items requested) were not included in the library field- testing as they were tested separately with database vendors (P2 was not tested either as it requires U4 for calculation).

The table shows that, even excluding highly experimental digital collection statistics (D1-D3), many libraries could not report a number of data elements. For example, Library-04 is missing three cost statistics (C1, C4, and C5), two digital collection statistics (D1 and D2), and one performance measure (P3). On the other hand, Library 11 was able to report all but one cost statistic (C5).

It appears that although libraries were able to report statistics related to electronic resources, they seem to have had more difficulty collecting statistics related to expenditures (C1-C5, in particular C5). Moreover, just because libraries were able to report certain statistics, the data collection was not necessarily complete and easy. Even a cursory reading of the comments in the evaluation.forms makes us believe that, in some cases, numbers were generated at a cost of many staff hours and development of local procedures to collect them.

Table 2. 4 Field-testing Participation Results

	R1	R2	R3	R4	R5	R6	U1	C1	C2	C3	C4	C5	D1	D2	D3	P1	P3	P4
Library-01	•	•	•	•	•	•	•	•	•	•	•	•	•	•	n/a	n/a	n/a	n/a
Library-02	•	•	•	•	•	•	•	•	•	•	•	•	n/a	n/a	n/a	•	•	•
Library-03	•	•	•	•	•	n/a	•	•	•	•	•	•	•	•	•	•	n/a	n/a
Library-04	•	•	•	•	•	•	•	n/a	•	•	n/a	n/a	•	n/a	n/a	•	n/a	•
Library-05	•	•	•	•	•	•	•	•	•	•	•	n/a	•	•	•	•	n/a	•
Library-06	•	•	•	•	•	•	•	•	•	•	•	•	n/a	n/a	n/a	•	•	•
Library-07	•	•	•	•	•	•	•	•	•	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Library-08	•	•	•	•	•	•	•	•	•	•	•	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Library-09	•	•	•	•	•	•	•	•	•	•	•	•	•	n/a	•	n/a	n/a	n/a
Library-10	•	•	•	•	•	•	•	•	•	•	•	n/a	•	•	n/a	•	•	•
Library-11	•	•	•	•	•	•	•	•	•	•	•	n/a	•	•	•	•	•	•
Library-12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	n/a	n/a	n/a
Library-13	n/a	•	•	•	n/a	n/a	n/a	n/a	•	n/a	•	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Library-14	•	•	•	•	•	•	•	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Library-15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Library-16	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

• : data reported
n/a: unable to report or not applicable (libraries who were not testing digital collection statistics)
x : no submission

A majority of libraries reported electronic reference transactions (U1). In the cost statistics (C1 through C5), C2 (cost of electronic reference sources) was most readily available by field-testing libraries whereas C5 (external expenditures for bibliographic utilities, networks and consortia) was reported by only a handful. The majority of missing performance measures data (P1, P3, and P4) is due to missing base statistics data elements (R3, U1, U2) required to calculate performance measures.

Table 2.5 shows another picture of the data collection efforts. It shows the number of staff hours spent to collect each category of data elements. While the field-testing instructions required that field-testing libraries keep track of staff hours devoted to preparing and carrying out data collection activities, we believe that the reported hours are an underestimation. We estimate that more stringent time keeping could have resulted in increased reported staff hours.

Looking at the total number of hours spent, there is a wide range from only 7 hours to 164 hours, which is equivalent to one staff member spending 4.5 weeks (based on 37.5 hour week) for field-testing. It is difficult to tell, just by looking at the number of hours spent, which libraries were more efficient in executing field-testing.

Table 2.5 Approximate time taken to collect data (in hours)

	Resource	Cost	Use	Digital	Performance	Total
Library-01	12.00	n/a	2.00	8.00	n/a	22.00
Library-03	15.50	13.00	0.50	16.00	n/a	45.00
Library-04	32.50	32.00	2.00	1.00	3.50	71.00
Library-05	13.00	6.25	2.00	7.50	3.00	31.75
Library-06	31.00	27.50	1.00	n/a	12.00	71.50
Library-07	32.00	n/a	n/a	n/a	n/a	32.00
Library-08	1.00	0.25	8.00	n/a	n/a	9.25
Library-09	1.00	n/a	2.00	20.00	0.50	23.50
Library-10	39.00	1.00	2.50	2.50	14.00	59.00
Library-11	80.00	2.00	8.00	70.00	4.00	164.00
Library-12	6.00	1.00	n/a	n/a	n/a	7.00
Library-13	14.00	7.00	n/a	n/a	n/a	21.00

Library 2 and 14 did not report the data.
n/a: not available or not applicable

Library-11, which was by far the most involved field test library based on the number of hours spent, not surprisingly reported the most complete data (refer to Table 2.5). It was clear from the reported data and the comments that the library had internal data collection resources (such as an electronic resource management database) not available in many other field-testing libraries. Nonetheless, it tried to conform to the field-testing definitions and procedures, which resulted in high staff hours spent.

On the other hand, Library-12 also was able to report more statistics than average participants while spending minimal hours (7 hours), largely because it used rough numbers that it already had without investing extra efforts to refine those and trying to conform to the field-testing instructions.

Simple comparison of staff hours spent does not indicate any conclusive relationship between the completeness of data and the invested efforts. Library 4, spent at least 71 hours but missed quite a few statistics. On the other hand, Library 13 spent 21 hours and, predictably, was able to report only a few statistics.

One clear conclusion from the results is that there is a varying level of effort. But it is not certain whether the levels of effort at these libraries will remain the same when these statistics become regularly collected and reported. Better internal systems that support this kind of data collection combined with more routine and consistent data collection procedures will certainly improve the efficiency of data collection operations.

Many libraries commented that a good portion of their time was spent trying to understand the field-testing instructions and establishing local procedures and organizational arrangements. For example, Library-01 reported "3 FTE staff spent 4 hours compiling the data for measures R1-R6. Initial 8 hours to develop the local in-house electronic resources spreadsheet."

A number of libraries also commented that they spent many hours, largely because this was the first time they collected these statistics, but they felt that ongoing data collection would improve in terms of efficiency.

Field-testing was time consuming partly due to the artificial requirements imbedded in the field-testing. For example, we asked more detailed information than would be necessary in an ongoing regular data collection to make sure that there was consistency in reporting data. Without asking for detailed data, we would have had no way of knowing, for example, whether what one library treated as a full-text journal was treated similarly by other libraries. This created an extra burden on the libraries and may have contributed to some of the missing data. We believe that with more relaxed requirements, we could have avoided situations in which one library spent "4 man-hours to verify that we could not do this" while another devoted "8 hours until the effort was abandoned." However, more lax requirements would have exacerbated the already significant problem of inaccurate, inconsistent, and unreliable statistics.

The following points summarize what was learned from analyzing the time taken to carry out field-testing and library comments:

- It is likely that libraries will spend varying amounts of time, effort, and resources to conduct ongoing collection of statistics and measures related to electronic resources and services. The degree of effort depends on the library's capability (resources) and interest in data collection and use.
- With investment in internal information systems and establishing ongoing local procedures, the effort to collect these statistics can be decreased significantly. However, given the fact that current metrics will evolve over time and that individual libraries will want to collect local specific data, we believe that libraries will need to commit a significant amount of time and effort to plan for and collect data regarding electronic resources and services.
- Standardized definitions and procedures will improve data collection and lead to consistent reporting of these statistics.

2.3.1 USEFULNESS OF STATISTICS AND MEASURES GATHERED

In the self-evaluation form, we asked libraries to assess the usefulness/value of each statistic relative to the amount of time and effort spent. The first thing we noticed was that there were not many outright rejections of statistics and measures due to a perceived lack of usefulness. As for the reasons some statistics and measures were considered potentially useful, we did not find a wide range of responses. Typical examples of use were trend plotting, benchmarking, and reporting. Perhaps the question itself was not specific enough: we did not ask what kinds of questions could be answered by having these questions, only the degree to which a statistic was useful. Another explanation for the lack of specificity may have been that the statistics and measures tested are more or less gross figures and by themselves may not directly relate to specific decision-making situations. One could also point to the fact that the comments and evaluations reflect the views of people who replied (librarians) and may not encompass others' views (such as library directors or university administrators). Overall, it appears that libraries saw these measures as good things to have in the absence of more detailed data.

Table 2.6 contains verbatim statements found in the comments to Question 5. It shows a range of reasons why a statistic or a measure may or may not be considered useful. It also suggests that in some cases, a change in the definitions and procedures need to be made.

Table 2. 6 Examples of usefulness statements

Useful	Not Useful	Other
• Useful for benchmarking. (R1) • This is a very useful stat to keep as we anticipate the % of e-reference to total reference will be shifting. (U1) • Essential for fiscal accounting and reporting. (C1-C3) • A best buy in terms of benefit:cost. (C3) • Very valuable, as it captures a significant expenditure made on behalf of the library. (C5) • It is important and often asked for. (D2) • We were very interested in determining personnel costs and found the data gathering worth the effort. (D3) • Very useful. The stat will enable us to establish trends for our service areas that are useful for planning purposes. (P1) • Since ebooks are only recently becoming more prevalent, it will become an increasingly important measure, no doubt. (P4)	• We have an electronic journal database, so this was actually easy to get. I am not sure why it is important. (R2) • Not very useful, though not difficult. (R4) • It is of doubtful value. (U1) • I don't know. (C3) • It seems not worth collecting. As defined here it is too imprecise and it seems to be a very small cost compared to the other ones. (C4) • Not worth it. What we submitted here is a partial answer, and an incorrect one at that. (D3)	• For us, it isn't worth the time if we must separate institution subscriptions from consortia and other. (R1) • We do need to simplify this statistics. (C1) • The overall data is worth collecting. The time needed to prorate expenditures is cost-prohibitive. (C1) • Maybe of local interest only. Less useful for inter-institutional benchmarking. (D2)

* Notations in the parentheses refer to the statistic or measure to which the comment was made.

Based on the comments and analysis of reported data, we can place different statistics and measures in a 2 by 2 matrix, according to their usefulness and practicality of data collection, to decide whether we need to include, exclude, or make changes to them. Figure 2.4 shows possible actions to the statistics and measures based on two criteria being used.

Figure 2.4 Actions to statistics and measures based on usefulness and practicality

Practicality	No	Simplify/Clarify	Throw Away
	Yes	Keep	Not worth it
		Yes	No
		Usefulness/Value	

Again we emphasize that there was no statistic or measure tested that was rejected by the majority of field-testing librarians. There were cases where changes in the procedures were necessary to make the data collection more feasible and efficient. As a result, most of the tested statistics and measures gravitate toward Keep or Simplify/Clarify quadrants.

Table 2.7 shows the lists of statistics and measures before and after the field-testing with brief explanations. A revised data collection manual is provided in this report using the new set of statistics and measures.

Table 2.7 Changes in the make-up of statistics and measures

Field Tested Statistics and Measures	Statistics and Measures After Field-testing	Changes
R1 Number of electronic full-text journals (through institutional subscription)	**R1** Number of electronic full-text journals	Eliminated institutional/consortium subscription distinction.
R2 Number of electronic full-text journals (through consortia and other arrangements)		
R3 Number of electronic reference sources (through institutional subscription)	**R2** Number of electronic reference sources	
R4 Number of electronic reference sources (through consortia and other arrangements)		
R5 Number of electronic books (through institutional subscription)	**R3** Number of electronic books	
R6 Number of electronic books (through consortia and other arrangements)		
U1 Number of electronic reference transactions	**U1** Number of electronic reference transactions	Changed the unit from questions to transactions
U2 Number of logins (sessions) to electronic databases	**U2** Number of logins (sessions) to electronic databases	Field-tested separately. No change
U3 Number of queries (searches) in electronic databases	**U3** Number of queries (searches) in electronic databases	

Field Tested Statistics and Measures	Statistics and Measures After Field-testing	Changes
U4 Items examined in electronic databases	**U4** Items examined in electronic databases	
	U5 Number of virtual visits to the networked library resources	Newly created to calculate new P2. Was not accounted for previously.
C1 Cost of electronic full-text journals	**C1** Cost of electronic full-text journals	Relaxed the expenditure prorating.
C2 Cost of electronic reference sources	**C2** Cost of electronic reference sources	
C3 Cost of electronic books	**C3** Cost of electronic books	
C4 Library expenditures for bibliographic utilities, networks, and consortia	**C4** Library expenditures for bibliographic utilities, networks, and consortia	No change
C5 External expenditures for bibliographic utilities, networks, and consortia	**C5** External expenditures for bibliographic utilities, networks, and consortia	No change
D1 Size of library digital collection	**D1** Size of library digital collection	Emphasized local use of data and de-emphasized cross comparison
D2 Use of library digital collection	**D2** Use of library digital collection	
D3 Cost of digital collection construction and management	**D3** Cost of digital collection construction and management	
P1 Percentage of electronic reference transactions of total reference	**P1** Percentage of electronic reference transactions of total reference	No change -> See U1
P2 Percentage of electronic materials use of total library materials use		Dropped because it has too many components that are not defined elsewhere.
P3 Percentage of remote library visits of all library visits	**P2** Percentage of virtual library visits of all library visits	No change
P4 Percentage of electronic books to all monographs	**P3** Percentage of electronic books to all monographs	No change

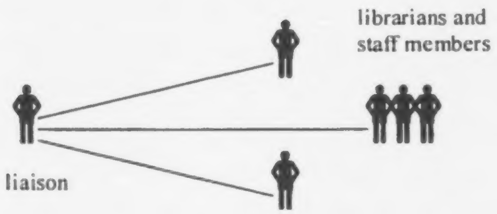
2.3.2 OTHER CHALLENGES AND LESSONS

In general, despite the fact that many statistics are gross figures and concerned mostly with resource counts and costs, data collection was not easy. There are a number of issues and challenges that affect the library's ability to collect statistics and measures to describe its networked resources and services:

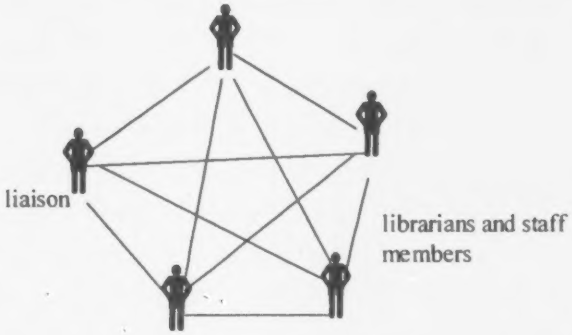
- *Acquisitions, accounting, and cataloging systems are not set up to support this kind of data collection.* Current bibliographic and management information systems, for the most part, reflect practices in the pre-Web, print-dominant environment. It appears that providing access to electronic resources is keeping many research libraries busy enough already. The lack of efficient information systems that pull together elementary data elements forced many field-testing libraries to resort to labor-intensive processes to collect data. According to a recent survey done by Tim Jewell at the University of Washington Libraries, there are about 10 ARL libraries that have a production system for managing electronic resources, and several others in the planning or development stage (http://www.library.cornell.edu/cts/elicensestudy/home.html). While these systems are not developed solely for data collection purposes, they certainly facilitate the data collection efforts such as the E-Metrics project. In the absence of such fully developed information systems, we advise ARL libraries to develop, at a minimum, an in-house spreadsheet or database file to keep track of key data elements related to electronic resources and services.

- *Prescribed definitions and procedures are not compatible with local practices.* Several field-testing libraries independently have been collecting some of the similar statistics and measures, but their definitions and promulgation of the methodologies differ from what the field-testing entailed. It seems that the majority of libraries want to build their local procedures in sync with the standardized ARL practices, a sentiment that is echoed in the following comment: "We will adjust our in-house practices to be able to report in this way." The data collection manual included in this report is one step in that direction.
- *The nature of electronic resources and services is still fluid and makes it difficult to devise clear-cut definitions and procedures.* For instance, as several people have already argued (Snowhill, 2001; Sottong, 2001), the concept of electronic books is still evolving due to changes in technology, the market, and use of resources among other things. For example, think of the full-text search capability in most electronic books. It can be argued that there is no clear distinction between electronic books and reference sources, especially from the user's point of view. We observe that electronic access can trigger an entirely new conceptualization of a given information object as in the case of electronic books. Libraries need to deal with the implications of this changing environment and, as one librarian commented during the site visit, be more flexible. We acknowledge that the distinction made for different electronic resources in the manual and in the current E-Metrics work is only temporary and will have to be revised as we progress.
- *The dispersed nature of resources in the networked environment makes it difficult to consolidate and manage statistics.* It also is a growing source of frustration for many librarians who deal with electronic resources. Various listservs devoted to electronic resources and voluminous correspondence on the listservs reflect this trend. Traditionally, library materials, with the notable exception of government publications, are centrally managed through a library catalog. Also, library visit counts have traditionally been normalized by using turnstile counts whenever possible. However, in the networked environment, libraries have to deal with a whole range of resources and access points. This in turn creates more complexity in not only managing resources but also collecting data about the resources and their use. For example, with respect to usage statistics of licensed materials, while setting up a library database gateway may allow the library to collect a coherent statistic (e.g., attempted logins to licensed databases), it does not account for traffic that goes directly to vendor websites. On the other hand, usage statistics from database vendors are more complete in the sense that they capture all requested use of the database, but the incompatibility of statistics from various vendors makes it difficult for the libraries to compare and aggregate usage data. Therefore, it is important that libraries be able to deal with incomplete, incompatible data from multiple sources and make the best decisions based on the given data.
- *Related to the issue of the dispersed nature of resources and performance statistics is the organizational structure needed to manage electronic resources and services, particularly the configuration of personnel and workflow to support the collection of statistics and measures.* In the context of field-testing, we observed, to the extent it can be generalized, two types of organizational setups used to carry out data collection:

  1. A single person making requests to other librarians and staff members for data needs and processing and summarizing collected data. This person is most likely the electronic resource librarian, head of collections, or someone who is responsible for overall library statistical matters. For this kind of organizational structure to work, the library needs to understand that what this person is doing is critical, and to see the benefits of sharing information. A drawback to this arrangement is that there is a lack of overlap of expertise and broad sharing of information.



2. A team structure which coordinates the entire aspect of electronic resource management including acquisition, access, and evaluation. An example of this kind of structure is the NetDOC (Networked Databases on Campus) at the University of Manitoba Library. Consisting of about 10 people from various library departments, such as reference, collection management, systems, and administration, the committee oversees the management of electronic services through monthly and yearly reviews. Collection and review of usage statistics of licensed resources is an integral part of the committee's activities. While the amount of staff time and coordination can be substantial, it gives various internal stakeholders an opportunity to participate in the decision-making process. In addition, it promotes the sharing of expertise in the library.



As previously discussed, collecting data regarding networked resources and services is becoming increasingly dispersed and complex. Libraries need to consider organizational strategies to best support the management and monitoring of library services in the networked environment.

3 VENDOR STATISTICS STATUS REPORT

This part describes the activities and accomplishments of the study team and the members of the Working Group on Database Vendor Statistics on standardizing usage statistics from content providers.

3.1 PHASE I ACTIVITIES SUMMARY

During the ARL E-Metrics Project's Phase One, the study team completed data collection and analysis along a broad range of activities and issues related to measures of networked information resources and services. The brief overview below highlights the activities related to vendor statistics in Phase I.

3.1.1 VENDOR REPORTS

During the July 2000 ALA annual conference in Chicago, the ARL Working Group (WG) on Database Vendor Statistics had its first meeting. The WG is a smaller set of study participants (13) that focuses on the statistics describing use, users, costs, etc., of vendor databases. During the meeting, members of the Working Group were asked to submit a list of vendors with which they spent more than $20,000 for annual subscriptions and also to supply sample vendor reports and other information relevant to vendor statistics.

The study team received the vendor lists from nine libraries. Among these libraries, some sent us the top ten vendors, while others included a fairly comprehensive list of database vendors with whom they have subscriptions. The study team then reviewed the lists and identified the 12 most frequently listed. Figure 3.1 below lists the names of vendors whose usage statistics reports were analyzed in this study.

Figure 3.1 List of Compared Vendor Reports

Academic Press/IDEAL	Bell & Howell/ProQuest	Ebsco
Elsevier/ScienceDirect	GaleNet	HighWire
ISI/Web of Science	JSTOR	Lexis-Nexis
OCLC/FirstSearch	Ovid	SilverPlatter

The study team reviewed the sample vendor reports sent by libraries in terms of the statistics provided, format of the reports, frequency of reporting, statistics access, and other information that provides a concise summary of vendor offerings. The study team also tried to match statistics from each vendor to the ICOLC (International Consortium of Library Consortia) guidelines, as libraries and vendors both seem to be leaning toward the guideline as a current yardstick of how successful a vendor can be in delivering usage statistics.

Finally, the study team reviewed the definitions, descriptions, or explanations of the usage statistics provided by the vendors along with the actual reported statistics. This provided data regarding how much agreement there was among library vendors as to what the reported measures mean. Thus the findings presented in this report provide a snapshot at a particular point in time and serve as a standardized review of today's vendor statistics.

3.1.2 COMPARISON OF VENDOR REPORTS

Comparing vendor statistics reports proved to be a challenging task. First, many reports were written in such a way that it was difficult to decipher what exactly the reported statistics mean. Second, the reports are evolving constantly as the vendors change both the content and the format in attempts to improve their service. The analysis focused on three main areas: (1) Overall comparison of reported measures and delivery, (2) Availability (or lack)of definitions, and (3) Vendor compliance with the ICOLC guidelines.

Findings and issues identified in the comparison of vendor reports were as follows:

- *Many vendors offer multiple delivery options.* While the HTML format is easily viewed in a browser, text format (ASCII or comma separated) is easier to manipulate using a spreadsheet or database program. In some cases, libraries were not informed of the fact that the same report was available in an alternative form.
- *While most other reports provide raw statistics only, JSTOR provides institutional comparison of usage based on the size of institutions.* It also provides graphs showing usage trends over time.
- *Although not included in the comparison, the timeliness of usage reports was identified as one of the key issues.* While the majority of the vendors who provide a monthly report do so within the following month, some vendors lag several months behind and in some cases reports for a block of months are not available due to the technical failures of the vendor reporting program. It is strongly recommended that the availability of timely (needs to be specified) reports be stipulated in the licensing contract.
- *When database vendors provide journal level statistics, they should be arranged in such a way (e.g., alphabetically) to facilitate easy manipulation.* If a database product or a journal is broken into several different parts, as in the case of Medline having several blocks of files divided by the database coverage, the total usage for that database or journal needs to be provided.
- *When the usage statistics are available on the web, a user ID and a password are required to access the statistics.* JSTOR is an exception. It does not require a user ID and password. Instead anyone whose IP address belongs to the eligible IP block for use authentication can request and retrieve statistics. Sometimes, additional ID's and passwords are required to access statistics for each database or journal. HighWire is an example of such a case. Currently, it requires libraries to use the same user ID and password to access statistics as well as administer institutional profiles.
- *Overall, libraries want usage statistics that are easy to obtain and manipulate if necessary.* In other words, there should be little burden on the library to process the statistics. Ideally, vendors need to use standardized measures and formats. Another issue has to do with different needs from different libraries. It is strongly recommended that a summary level information be provided to all libraries. At the same time, detailed and granular statistics, in ASCII (Text) or comma separated file (CSV) format, should also be available to libraries that wish to obtain additional information about use and use patterns.
- *One of the most frequently cited complaints about the current vendor reports is the lack of standardized terms for key usage indicators and the lack of definitions.* Even when documentation is provided, it often consists of simple paraphrases of measures rather than explanatory descriptions of what the measures stand for and how they are being counted by the vendor.

In conclusion, the analysis of usage statistics from 12 major database vendors revealed a wide range of different practices. Details of these differences are discussed in the Phase I report. Progress is needed in several areas including standardization of core statistics, method of report delivery, and the timely provision of definitions of reported statistics. Some signs indicate that some vendors are moving in the right direction. One of the signs is the apparent willingness of many vendors to comply with the ICOLC guidelines. Coordination of these efforts seems necessary to bring about positive change in reporting practices and to develop consistent and comparable statistics.

3.2 ARL MEETING WITH VENDORS

The E-Metrics Phase I study of vendor statistics provided an overall picture of the current state of usage statistics offerings. However, the study team felt that, to make progress in the area, we needed to work with database vendors directly. Due to the large number of database vendors to which typical ARL libraries subscribe, the study team decided to focus on a select group of large database vendors that were identified during Phase I.

A meeting was planned on March 14, 2001, in conjunction with the ACRL Annual Meeting in Denver. Sherrie Schmidt (Arizona State) and Rush Miller (University of Pittsburgh), Project Co-Chairs sent invitations on behalf of ARL to the twelve vendors analyzed in Phase I plus netLibrary.

The meeting's goal was to engage the community of vendors, publishers and libraries in building consensus for reporting data on the use of vendor database statistics for libraries and promote understanding of what can and cannot be done vis a vis the provision of data from the vendor community. The meeting served as a discussion forum for:

- Sharing information about the development and standardization of selected statistics that describe users and uses of databases;
- Reaching agreement on the important data elements and definitions;
- Engaging vendors in a test of data elements the study team designed;
- Understanding the issues that affect vendor supplied statistics describing data base use and users; and
- Developing a process so that the library community and the vendor community can work together in developing and standardizing a core set of statistics.

A total of nine vendors (Figure 3.2) attended the meeting. All of the vendors, except for netLibrary, were the ones the study team identified during Phase I analysis.

Figure 3.2 List of Database Vendors attended the ARL Meeting

Elsevier/ScienceDirect	netLibrary	OCLC/FirstSearch
JSTOR	Bell & Howell	Ovid
Lexis-Nexis	Gale Group	EBSCO

From the E-Metrics Project, the following people attended the meeting:

- Co-chairs: Sherrie Schmidt (Arizona State) and Rush Miller (Pittsburgh);
- Library Representatives: Betty Day (Maryland), Kurt Murphy (Arizona State), and Sue Phillips (Texas-Austin, also ICOLC liaison);

- Study team: Wonsik "Jeff" Shim (Florida State); and
- ARL Staff: Martha Kyrillidou and Julia Blixrud.

The following summarizes the events during the meeting.

- Rush Miller gave a brief overview of the ARL E-Metrics project.
- Sue Phillips reported that an initial survey is under way to find out the ICOLC member libraries' opinions about vendor statistics. The results will be used as a basis to update the ICOLC guidelines.
- Jeff Shim provided some background information on why libraries need usage data from electronic database vendors, and what kinds of data they need; he also gave an illustration of data use in one project participant library. The data presented were all based on the E-Metrics study results so far.
- Vendors presented their current and future report capabilities and offerings followed by a question-and-answer session.
- Jeff Shim talked about the current state of vendor statistics using the findings from the E-Metrics project. He also identified issues that need to be worked out in the future.
- Jeff outlined the next steps in terms of short-term and long-term goals, which included sending a list of field-testing libraries and more specific information (tasks, requirements) to the vendors. The vendors interested in participating in the field-testing were asked to work with the study team and the field-testing libraries during the month of May 2001.

Some of the issues discussed during the meeting included the following:

- Both vendor and library representatives agreed that the reported statistics should be based on the ICOLC guidelines.
- There was a concern that the ICOLC guidelines were composed with electronic databases in mind. Many vendors now have mixed content, and it appears that there aren't many guidelines for these vendors.
- Related to the previous item, the market is increasingly diversified in terms of business models, contents provided by vendors, and so on. Accordingly, developing a standardized set of statistics that cover all of these is going to be a big challenge.
- Everyone agreed that technologies and technology changes have a lot to do with what and how statistics can be collected and reported. For instance, Z39.50 clients do not allow statistics to be collected. There are solutions that are also technology based, such as digital certificates. However, in most cases, the costs of buying and implementing these technologies do not justify their use to produce more reliable and detailed data.
- It appears that different counting mechanisms are in place at different vendors. So the same statistic is counted differently. There should be some investigation into whether the reported statistics are comparable.

Overall, the meeting was very useful in the sense that it brought two parties, libraries and vendors, together. In addition, it was a necessary step for the upcoming field-testing. As a result of the meeting, all of the vendors present agreed to participate in the vendor statistics field-testing.

3.3 VENDOR STATISTICS FIELD-TESTING

This section describes the vendor statistics portion of the E-Metrics field-testing. The primary goal of the field-testing was to assess usage statistics from major database vendors in terms of comparability of statistics and their definitions, breakdown of data and report formats.

3.3.1 VENDOR STATISTICS FIELD-TESTING METHODOLOGIES

All twelve vendors agreed to participate in the field-testing. The invitation explained the goals and objectives of the field-testing and provided a brief summary of expected deliverables from each participating vendor.

The study team developed a set of field-testing guidelines and distributed an electronic copy to the vendors. In addition, the study team contacted project participants and solicited their participation in the field-testing. Since not all field-testing libraries subscribed to all of the services, the study team assigned three or four vendors to each library, as shown in Table 3.1, based on the libraries' subscription matrix. The intent was to alleviate the burden on the libraries of evaluating too many vendor reports. Also, from the standpoint of vendors, it seemed to make sense to concentrate on a few libraries rather than all of the libraries subscribing to their services.

Table 3.1 Library Assignment for Vendor Statistics Field-Testing

	Academic Press	Bell & Howell	Ebsco	Science Direct	Gale Net	ISI/ Web Science	JSTOR	Lexis-Nexis	Net Library	OCLC/ FirstSearch	OVID	Silver Platter
Alberta			XXX			XXX					XXX	
Arizona State	XXX	XXX										XXX
Auburn	XXX						XXX				XXX	
Cornell		XXX	XXX		XXX					XXX		
Manitoba		XXX					XXX			XXX		
Maryland		XXX			XXX				XXX			
Massachusetts	XXX						XXX				XXX	
Pennsylvania	XXX			XXX				XXX				
Pittsburgh			XXX	XXX						XXX	XXX	
Texas-Austin				XXX		XXX		XXX				XXX
Western Ontario							XXX	XXX	XXX			
Virginia Tech						XXX			XXX			XXX
Yale				XXX	XXX					XXX		

Library assignment is shown as triple x marks (xxx).

The guidelines specifically asked the following deliverables from each vendor:

- A monthly report (April 2001) in a standardized text format (specific guidelines were given for data elements and their arrangement);
- A detailed, step-by-step description of the process employed to collect the statistics including the rules and assumptions applied in the process;
- A monthly (April 2001) raw data log file; and
- Issues and suggestions related to providing usage statistics.

The study team asked the vendors to send the field-testing data to their assigned libraries as well as to the study team by the last week of May.

The study team asked the field-testing libraries to assess each vendor report considering the following questions.

1. Describe what data and information you received from the vendor during the field-testing. Describe the file format, contents, data elements, description, and organization of the data as received.
2. What level of effort was required to manipulate the field-testing monthly report data you received from the vendor? How did you process/analyze the data (e.g., tools, analysis, etc)?
3. Please describe how the field-testing monthly report differed from the reports you usually receive from the vendor.
4. Were you able to compare the data fields accurately to other data fields provided by this vendor as well as to data fields from other vendor reports? Describe specific issues/problems you encountered in doing so.
5. To what degree are the data from this report worth using for library decision-making given the amount of time and effort required to analyze them?
6. What recommendations would you make to improve the vendor report?

3.3.2 VENDOR STATISTICS FIELD-TESTING RESULTS

3.3.2.1 VENDOR REPORT COMPARISON

A total of eight vendors were actually able to participate in the field-testing, as shown in Table 3.2. The table also shows the data formats in which the field test report were provided by the vendors and the availability of documentation received from the vendors in regard to definitions of statistics provided and information about how data are collected, filtered and aggregated.

Table 3.2 Vendor Statistics Field-testing Participation

Vendors	Data Format	Availability and quality of Documentation	
		Definition	Data collection
Academic Press	txt, Excel	n/a	n/a
Bell & Howell	zip(Excel, txt, PDF)*	Fair	Poor
Ebsco	txt	Good	Fair
Gale Group	csv	Fair	Poor
Lexis-Nexis	zip(csv), Word, txt	Poor	Fair
NetLibrary	zip(txt), csv	Good	Good
Science Direct	txt	Fair	Good
SilverPlatter	csv	n/a	n/a

ISI (Web of Science), JSTOR, OCLC (First Search) and Ovid did not participate in the field-testing.
* Part of report in PDF format; n/a: not available from the vendor during the field-testing.
Poor: shallow, not specific; Fair: somewhat useful, Good: easy to understand , useful; Excellent: in-depth, easy to understand.

While it was one of the requirements in the vendor statistics field-testing, the majority of vendors we investigated during Phase II provide usage reports in a text format as well as other formats. However, as we will discuss later, standardization of data elements and their arrangement are key areas for further improvement.

As compared to the results from the Phase I vendor statistics analysis, the evidence indicates that vendors have made good efforts especially in the area of making documentation available. Many vendors simply did not have any documentation about usage statistics at all when we analyzed their reports during Phase I. Several vendors' documentation was organized like their report structures and did not contain the information that met the requirements for the field-testing.

Table 3.3 Key ICOLC Statistics Included in the Vendor Reports (by vendor)

VENDORS	Items requested	Searches	Sessions	Turnaways
Academic Press/ IDEAL	Fulltext, reference, abstract, table of contents	Yes	Yes	n/a
Bell & Howell	Fulltext, abstract, citation	Yes	No	n/a
Ebsco	Fultext, abstract	Yes	Yes	n/a
Gale Group	Fulltext, citation & abstract, hits, views, print station	Yes	Yes	Yes
Lexis-Nexis	Fulltext, document retrievals	Yes	No	n/a
NetLibrary	Pageview, browse, checkout, dictionary use	Yes	Yes	Yes
Science Direct	Fulltext, abstract	Yes	Yes	n/a
SilverPlatter	Fulltext, abstract	Yes	Yes	Yes

n/a: not applicable

Table 3.3 shows key ICOLC statistics included in each vendor's field-testing report. The study team has not attempted to validate the compliance with the ICOLC guidelines. Aside from the ICOLC guidelines, there are many instances where the same statistics from different vendors are not really equal measures. For example, the session count will vary considerably depending on the time-out cutoff that vendors use. The documentation shows a wide range of time-outs (e.g., Gale: 6 minutes, Ebsco: 10 minutes, and Science Direct: 30 minutes).

Another area that makes cross comparison more difficult is the items requested statistic, due to the fact that the types of content available through vendors are diverse and the terms referring to information items are not quite standardized. For example, netLibrary, who was not studied during Phase I but nonetheless is gaining noticeable presence in research libraries, does not lend itself easily to the kinds of statistics we are now familiar with. This poses a serious problem when libraries try to aggregate the total number of item access for cross vendor comparison or to gauge the total amount of information transfer from licensed materials available at their institutions.

The turn-away statistic has been useful in determining whether or not to increment (rarely, to reduce) the number of simultaneous user licenses. Table 3.4 shows that out of the eight vendors, only three have such a restriction.

Table 3.4 Breakdown of Statistics in the Vendor Reports (by vendor)

Vendors	By journal or database title	IP	Time/Day	Other
Academic Press/ IDEAL	Journal title	Yes	n/a	
Bell & Howell /Proquest	Database title, journal title	Yes	Time	Client ID
Ebsco	Database title	Yes	n/a	Group and profile ID
Gale Group	Database title, journal title	n/a	Time, Day	
Lexis-Nexis	Database title	Yes	Time, Day*	
NetLibrary	Book title	Yes	Time, day	
Science Direct	Journal title	Yes	n/a	Subscribed vs. non-subscribed
SilverPlatter	Database title	n/a	n/a	Peak time and duration

By journal title (or journal name by some vendors) means statistics are reported at the journal or newspaper or magazine level; by database title means statistics are reported at groups of journals or source files designated by the vendors.

n/a: not available, * average usage

Table 3.4 shows a breakdown of reported statistics according to the ICOLC recommended categories. It also lists any other breakdown categories that the vendors reported. It appears that vendors, in general, satisfied the title level (journal, database, or book) breakdown requirement. The IP breakdown requirement was also being respected. But in all cases, the statistics were lumped at the subnet (a group of IP address block) level at the individual IP address level. The tabulation might not have been included in summary statistics anyway because it is something that can be available in log files. Unfortunately, most vendors were unable to furnish log data files due to technical and legal concerns. Half of the vendors currently provide some time-related breakdowns.

3.3.2.2 LIBRARIES' EVALUATION OF VENDOR REPORTS

3.3.2.2.1 Level of effort required to manipulate the field-testing monthly reports

Overall, libraries reported that the data files were easy to read and process. The majority of libraries used Microsoft Excel to import and display data files. In one case, a vendor sent part of the data files in pdf format and forced the recipient libraries to enter the numbers manually. The results show that libraries would prefer data formats, notably text formats, that can be easily imported into data analysis programs such as Excel and Lotus 1-2-3 without having to spend extra time and effort to manipulate or enter data.

While all participating libraries at least opened the data files, only a few attempted to analyze the data. There seemed to be several reasons why libraries were hesitant about in-depth analysis of data. One library commented that it did not test the data since it was the summary data and not raw data which they expected from the field-testing. The following comment from another library also explains why libraries have not done further analysis: "We currently place raw vendor statistics on our staff intranet and do not compile them for comparison purposes, as we have yet to define what statistics and what format would best suit our institutional needs for such a compilation."

At least one library reported specifically how they processed the field-testing data. For each vendor they analyzed, they compared the session counts from the library redirect page (all requests to external vendor databases pass through a webpage that counts how many times different databases are accessed) and the vendor report. This produced, for each database, a rough idea of what portion of attempted logins (sessions) originates from people who bypass the library database webpage. The library also calculated the estimated cost per article viewed and distribution of articles viewed by title, which confirmed that 25% of the titles account for 80% of articles viewed for the particular database.

3.3.2.2.2 Comparison of field-testing report and regular monthly report that libraries received

The field-testing instructions provided guidelines in terms of essential data elements, data arrangement and file format. Contrary to our expectations, all of the vendors simply repackaged their monthly usage reports and submitted them to the libraries and the study team as their field-testing report. Therefore, the only practical difference between the field-testing report and the report that libraries access from the vendor website in a normal situation was that libraries received the data files directly from the vendors instead of retrieving them from vendor websites. Several libraries appreciated the fact that they could receive data files in text format, which is much easier to handle than, say, HTML format. Another minor difference was the availability of data definitions and statistics collection processes from some of the participating vendors. In some cases, this was the first time that the explanations were available to the libraries. Typically documents that contain definitions of statistics and other background information, if they are available, are provided on the vendors' websites.

3.3.2.2.3 Comparison of field-testing data with the same vendors and across vendors

We assigned three or four vendors to each field-testing library so that libraries could compare data from multiple vendors. Largely it did not work as we had intended because several vendors, who promised to participate, did not provide data at all.

Even if data were available from several vendors, it was difficult for the libraries to do valid comparisons of data because sufficient descriptions of data definitions and how the data were collected and summarized were not available. Many libraries feared that, without the explanatory information about what each data element in vendor reports meant and how the counts were filtered, such comparison would have resulted in comparing apples and oranges. This suggests that until there is a satisfactory degree of assurance that the statistics different vendors provide, based on the documentation they provide, are consistent enough for cross comparison, libraries will not commit major resources to compile vendor data into a standardized format or repository.

Another problem with comparing data from multiple vendors was the inconsistent data formats. The task of combining data fields and adjusting data arrangement from even three or four vendors proved to be extremely time consuming. What libraries want is a standardized usage report, containing common data elements and arranged in predetermined, agreed upon order, that is provided separately from vendor specific data elements or additional data. Even the different placement of field headings, in a column or in a row, requires extra efforts from the libraries.

3.3.2.2.4 Value of Vendor Reported Usage Data

The majority of respondents said that the data provided by these vendors are "necessary and valuable". They like the fact that the data are "very straightforward and easy to use" and, more importantly, that the data provide some indication of the extent to which subscription-based services are being utilized. Of course, the relative value depends on the quality of data and the importance of the database to the library (e.g., the amount of money the library spends for a particular database as compared to other databases they subscribe to).

While, the majority of libraries feel that usage reports provided by the individual vendors are useful, there is some doubt about the cumulative value of all usage reports combined. Given the fact that typical ARL libraries deal with several dozen database vendors, normalizing data, in current forms, from these vendors will require a considerable effort on the part of libraries.

Usage reports almost exclusively deal with specific use of vendor databases in terms of frequencies (e.g., searches and sessions), duration (e.g., connection time), and amount of information transfer (e.g., items requested) while largely ignoring another dimension that many libraries consider very important: information on user behavior. The current usage metrics do provide information about user behavior to a degree but not at the level many libraries would hope. At least one statistic included in the ICOLC guideline seems to deal with an aspect of user behavior: menu selection. However, because of different interfaces and types of content provided by the vendors, it would be difficult to imagine vendor report menu selection reported in a consistent manner. As a result, libraries get bits and pieces of information in as many different ways as there are vendors.

To be truly useful, information on user behavior will need to be correlated with individual user profiles. But the current environment for database access, which is heavily rooted on IP-based authentication, does not permit the kinds of data collection that libraries expect. So, on the one hand, there is a desire to receive more detailed information about user behaviors, but, on the other hand, that desire conflicts with the current practices and the libraries' concern about user privacy.

The best the vendors can do is provide an option that allows libraries to access raw data log files that have sufficient information for useful analysis. Unfortunately, many vendors were not able to provide log data files because of technical and legal concerns.

3.3.2.3 SUMMARY OF VENDOR STATISTICS FIELD-TESTING

3.3.2.3.1 Are the data provided to libraries reliable?

Since the field-testing dealt with only one month's worth of data, it is difficult to answer the question. However, we have not heard from the field-testing libraries of any unusual discrepancy between the field-testing data and data they received before the field-testing. The study team realizes that just comparing data from the same vendors will not give us a satisfactory answer. During the course of writing this report, we came across an email message from a major database vendor acknowledging errors in their usage reports. This suggests that libraries are really not in a good position to know what exactly goes into the vendor reports. Some unusual numbers or patterns are relatively easy to identify. But consistent under (or over) counts are harder to detect.

One way to deal with the reliability issue is to collect data that libraries can generate in-house. For example, some libraries have set up a redirect webpage for external databases to count the number of attempted logins to licensed databases. This kind of data gives clues that can be used to cross-check vendor-supplied numbers. Also, the library community needs to consider concrete ways (e.g., third party validation) to ensure consistent and reliable reporting from vendors, or at least should demand from vendors better documentation of the data collection and filtering process.

3.3.2.3.2 Are the data comparable across libraries, products, and vendors?

Use of different system parameters (e.g., time-out), application of different assumptions about user behavior (e.g., how to treat or count multiple clicks on the same document within a session), and the lack of adequate explanation in vendor documentation regarding specific definitions and data collection and filtering processes all contribute to the problem. Therefore, we conclude that it is largely impossible to compare data across vendors, and we recommend that comparison be limited to data from the same vendors. We believe that the comprehensive standardization of usage statistics and data delivery methods (e.g., file format and data arrangement) cannot be easily achieved in the short-term. Those are long-term goals toward which vendors and libraries need to work together. The ARL community should continue to make progress in this area by working amongst themselves and with the database vendor community.

3.3.2.3.3 Is the data easy to obtain and manipulate?

We believe that the data provided from the vendors studied are easy to obtain and manipulate. Most vendors offer several data formats including text format (e.g., comma separated file) and spreadsheet format (e.g., MS Excel) in addition to standard HTML format for easy viewing in web browsers. Also, many vendors offer an ad-hoc report generation facility whereby libraries can customize the fields they want to examine and set desired time periods.

However, we estimate that processing vendor reports from multiple vendors can become a considerable burden on libraries, in terms of time and staff efforts, as the formats and data arrangements vary considerably from vendor to vendor. We strongly recommend that vendors report standardized usage statistics, such as the ones recommended by the ICOLC and those found in part 4. These should appear in the standardized column and row arrangements and include a separate report that contains vendor specific additional data.

3.3.2.3.4 Does the data provide meaningful information about the usage of networked information resources?

Usage statistics currently being provided by vendors give useful information regarding the utilization of external subscription-based information services. Libraries use data for a variety of purposes: usage trends over time, justification for expenditures, cost analysis, modification of service provision. Related to the issue of the value of data is trustworthiness (reliability) of data. Also, there is some concern over the lack of user-related information in usage statistics as discussed earlier.

3.3.3 SHORT-TERM RECOMMENDATIONS

This section offers several suggestions that may be useful for ARL libraries to consider in dealing specifically with vendor statistics.

- *Focus data analysis on high impact databases:* We recommend that libraries not treat all databases equally when it comes to data analysis. Due to inconsistencies of data elements and report delivery, it is difficult to normalize usage statistics from all vendors who report data. Instead, libraries need to investigate the usage patterns of "major" databases, whatever those might be locally, and ways in which improvements can be made in terms of access and use of materials.
- *Collect locally obtainable data for external databases:* While libraries need to depend on database vendors for usage statistics, they have several ways (e.g., through redirect page counters for licensed databases or through proxy server logs) to capture at least partial information on user access to the external databases (e.g., attempted logins). This kind of internal data helps libraries spot check the reliability of vendor-supplied usage statistics. Furthermore, since the data will be under the control of libraries, they are more consistent than measures reported by different vendors.

- *Keep track of aggregate key statistics and use them:* Libraries often find themselves in need of gross figures of user access to external licensed databases for various internal and external use. The aggregate numbers are good indicators of overall trends in user demand for and access to external databases. In doing so, it is important to keep some level of consistency in the way the gross figures are calculated and reported. One way to maintain consistency is to gather data from the same pool of database vendors or database titles over a specified period of time (e.g., "Total number of searches conducted in existing licensed databases grew by 20% in 2000 to 1,200,000 as compared to the 1999 total of 1,000,000 searches. The data is based on the same 35 vendors who report the statistic.").

3.4 ISSUES AND FUTURE ACTIONS

ARL libraries have needed consistent, comparable, easy-to-use, and useful usage statistics from content providers (database vendors) ever since they embraced the notion of courting their users of external licensed materials. The ARL E-Metrics project provided an opportunity for the ARL community to look at the problems related to vendor usage reporting in a more systematic way and to begin working toward developing more useful reports.

Some of the issues that need to be considered in dealing with vendor usage reports in the future include the following:

- The market for electronic content providers is becoming more diverse and complicated. We need to think about the types of statistics that best serve libraries in this changing environment. Companies such as netLibrary did not even exist when the ICOLC guidelines were drafted. A related issue is the effect of mega-mergers that are taking place in the electronic content providers' market.
- For the most part, we have been relying on the ICOLC guidelines as the de facto standard for usage statistics for licensed materials. While most vendors included in the study claimed a high level of compliance with the guidelines, some librarians remain skeptical, citing the differences in the way statistics are being collected by different vendors (e.g., different time-outs) and the lack of concrete documentation. The ICOLC guidelines are concerned mainly with defining basic usage statistics and do not contain detailed information that we can use to validate vendor reports adhering to the standard. Among librarians, we may have different opinions about how statistics should be counted. What level of specificity are we pursuing in the standardized reports? And who is going to ensure that a vendor report meets the standard?
- In this study, we have not dealt with issues related to usage reporting in consortial arrangements. But as those are becoming staples in research libraries, we need to make efforts to make sure that individual members involved in consortia receive the same level of usage statistics for their institutions as in individual site licensing agreements.
- More than several organizations in library and vendor communities, national and international bodies, are currently working in this area (see Related Projects and Studies in the Phase I Report). While these initiatives do not overlap exactly in terms of their goals and scopes, as we emphasized in the Phase I report, there is a danger that they may result in conflicting reporting requirements. Specific ways to coordinate and encourage cooperation have yet to be thought out.

One important accomplishment during Phases I and II of the project was the initiation of conversations and working together with major database vendors. Work needs to continue, especially in the standardization of key usage statistics, data delivery, and better documentation of definitions and reporting procedures. To that end, the study team and ARL plan to organize the second meeting with the involved vendors in conjunction with the ALA Mid-Winter meeting in January 2002 to further move the process and make progress.

The accomplishments achieved during Phase II of the E-Metrics project would not have been possible without the active involvement of libraries and vendors who participated in the field- testing. We hope that both parties continue to be open-minded and to take active roles working together in the future.

4 DATA COLLECTION MANUAL FOR THE RECOMMENDED NETWORK STATISTICS AND PERFORMANCE MEASURES

This section provides definitions, data collection procedures, and discusses related issues pertaining to interpreting and using the recommended statistics and measures. The definitions and procedures were derived from a month of field-testing at more than a dozen ARL libraries. The statistics and performance measures represent a minimum set of data that need to be collected continually and used. Individual libraries will need to develop local procedures to support data collection activities within the guidelines of this manual. However, readers need to recognize that the statistics and measures will be refined and extended continuously in the future.

4.1 RECOMMENDED STATISTICS AND MEASURES

Table 4.1 Network Statistics

Patron Accessible Electronic Resources	R1	Number of electronic full-text journals
	R2	Number of electronic reference sources
	R3	Number of electronic books
Use of Networked Resources and Services	U1	Number of electronic reference transactions
	U2	Number of logins (sessions) to electronic databases
	U3	Number of queries (searches) in electronic databases
	U4	Items requested in electronic databases
	U5	Virtual visits to library's website and catalog
Expenditures for Networked Resources and Related Infrastructure	C1	Cost of electronic full-text journals
	C2	Cost of electronic reference sources
	C3	Cost of electronic books
	C4	Library expenditures for bibliographic utilities, networks, and consortia
	C5	External expenditures for bibliographic utilities, networks, and consortia
Library Digitization Activities	D1	Size of library digital collection
	D2	Use of library digital collection
	D3	Cost of digital collection construction and management

Table 4.2 Performance Measures

Performance Measures	P1	Percentage of electronic reference transactions of total reference
	P2	Percentage of virtual library visits of all library visits
	P3	Percentage of electronic books to all monographs

4.2 FORMAT OF DATA COLLECTION PROCEDURES FOR PERFORMANCE STATISTICS AND MEASURES

The data collection procedures for the statistics and performance measures are defined and described according to the following criteria:

Definition: Describes each statistic or performance measure.

Rationale: Discusses why the suggested statistic or performance measure is needed and/or how it can be useful to describe electronic resources and services.

Implementation: Provides instructions for implementing the identified statistic or performance measure, categorized by collector, frequency, procedures, and special considerations, if any.

Collected by: Identifies who is responsible for collecting data; *local* refers to the individual library and *vendors* refers to the content providers with whom the library has contracted to provide electronic resources.

Frequency: Identifies how often the statistic/measure needs to be collected.

Procedures: Outlines the manner in which the data for a statistic or performance measure may be collected. Also includes recommendations for forms.

Special considerations: Identifies special factors that need to be considered during data collection or interpretation.

Related issues: Discusses issues that go beyond the suggested data collection procedures, such as the availability of complementary statistics, ways in which statistics can be combined with other statistics, and other possible approaches to data collection.

4.3 DATA COLLECTION PROCEDURES FOR PERFORMANCE STATISTICS AND MEASURES

4.3.1 STATISTICS RELATED TO PATRON ACCESSIBLE RESOURCES

The developed statistics for patron accessible resources account for networked resources and services. The current ARL membership criteria index lacks separate measures for electronic and networked monographs, serials, and bibliographic utilities. Though these electronic and networked resources may limit the amount of print materials acquired and may cost more than their print counterparts, they do constitute more widely available resources.

In the electronic and networked realm, the more a library has, the more materials are provided to customers anytime and anywhere. Although local needs and available resource allocations may differ from library to library, the resource statistics allow academic research libraries to see and to demonstrate to others the changing nature of library collections over the years. In turn, the libraries are expected to use them to make decisions about resource allocations (budget, staff, time, etc.) and to undertake strategic planning accordingly. Furthermore, the picture of available resources provides libraries with an opportunity to offer valued services. However, because the evolving nature of these statistics will rely heavily on technological enhancements, all libraries are encouraged to use extra caution while serving their institutional goals, missions, and visions.

R1 -- Number of Electronic Full-Text Journals

Definition: Number of electronic full-text journal subscriptions that the library provides to users either through an individual institutional licensing contract with the provider of journals or through other arrangements (e.g., regional or state consortium) for which the library pays a reduced or no fee for access.

The full-text journals should provide both search and browse capabilities by title and issue. This is different from journal article databases, such as Expanded Academic ASAP in INFOTRAC, that do not provide browsing capability.

This includes electronic full-text journals offered by established scholarly journal publishing houses (e.g., Elsevier's ScienceDirect and Academic Press's IDEAL), scholarly societies (e.g., American Chemical Society journals and American Institute of Physics Online), and services which aggregate content from smaller publishers or from those publishers that prefer to use an external delivery platform (Highwire, OCLC ECO, and EbscoOnline). This should exclude general-purpose periodicals such as magazines and newspapers.

Rationale: Electronic access has expanded dramatically to provide a range of useful resources for library users. This statistic helps document the degree of expansion of electronic resource availability in the individual library and can be used to justify continuation and enhancement of these services.

Research libraries act increasingly as gateways to a vast array of external information. This measure specifically addresses the extensiveness of scholarly content a library provides to its user community. In many cases, electronic access enables the library to offer larger selections of journals than it could provide in paper format. This statistic can also be used for library promotion and internal and external reporting. Particularly, this statistic aims at showing the changing nature of traditional scholarly resources with improved and better access anytime and anywhere.

Implementation

- Collected by: Local and vendors
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures: It is impossible to obtain the complete list of electronic full-text journals from a single source. Possible sources for the information include library catalog records (those records that point to web addresses), library web pages that list the journal titles, the internal electronic resource management database, and vendor records (websites and contract documentation).

1. Create a master list of full-text electronic journals from all the sources available. Use a spreadsheet or database program to organize and maintain the list.
2. Remove titles that do not meet the above-mentioned definition but keep duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
3. Record the counts and be sure they are updated regularly. The library should also update the count information on the library website and/or in marketing brochures on a regular basis.

Special considerations: It is time-consuming to establish procedures to collect this statistic for the first time. However, once that is done, it will be relatively easy to update the information. (This applies to other statistics and measures included in the manual as well.)

Include journal titles that come with print subscriptions or print plus online subscriptions since the focus of the statistic has to do with how many scholarly electronic journal titles users can access. Do not include free government publications and free electronic journals to which the library provides links.

Free government publications and free electronic journals are a valuable resource for many libraries. How to collect statistics relating to these resources will be addressed in the future.

R2 -- Number of Electronic Reference Sources

Definition: Number of electronic reference sources and aggregation services that the library provides to users either through an individual licensing contract with the content providers or through other arrangements (e.g., regional or state consortium) for which the library pays a reduced or no fee for access.

This includes citation indexes and abstracts; full-text reference sources (e.g. encyclopedias, almanacs, biographical and statistical sources, and other quick fact-finding sources); full-text journal and periodical article collection services (e.g., EBSCOhost, ProQuest, Academic Universe, and INFOTRAC OneFile); dissertation and conference proceedings databases; and general-purpose magazines and newspapers. Licensed electronic resources also include those databases that institutions mount locally

Rationale: Networking technology in libraries has improved and increased dramatically user access to a range of useful reference resources. This statistic documents the degree of expansion of electronic resource availability and can be used to justify continuation and enhancement of these services. In the 1990s, because of the increasing popularity of the Internet, the ways reference interviews were held and reference sources were used changed. Today, users have electronic formats as well as traditional reference sources to provide answers to their reference questions.

Research libraries traditionally act as gateways to a vast array of external information. This measure deals with the extensiveness of scholarly content the library provides to the user community and the availability of reference sources on an anytime/anywhere basis. In many cases, electronic access enables the library to offer more resources than it could in paper format. This statistic can also be used for library promotion and internal and external reporting. Specifically, this statistic aims at showing the changing nature of traditional scholarly resources with improved access.

Implementation

- Collected by: Local and vendors
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures: As in the case of the number of electronic full-text journals, it is impossible to obtain the complete list of databases from a single source. Possible sources for the information include library catalog records (those records that point to web addresses), library web pages that list the database titles, the internal electronic resource management database, and vendor records (websites and contract documentation).

1. Create a master list of electronic databases from all the sources available. Use a spreadsheet or database program to organize and maintain the list.
2. Remove titles that do not meet the above-mentioned definition but keep duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
3. Record the counts and be sure they are updated regularly. The library should also update the count information on the library website and/or in marketing brochures on a regular basis.

Special considerations: The unit of measurement here is the database not the whole service provided by a vendor. For example, if the library subscribes to OVID and the company provides five databases (ABI/Inform, Books in Print, CINAHL, INSPEC, and PsycINFO), then the count is 5, not 1. By the same token, if the library subscribes to three database packages (Academic Universe, Congressional Universe, and Statistical Universe) from Lexis-Nexis, the count is 3.

This count should not include freely available databases to which the library provides links or library-created finding aids.

Freely available databases and library-created finding aids are a valuable resource for many libraries. How to collect statistics relating to these resources will be addressed in the future.

R3 -- Number of Electronic Books

Definition: Number of electronic full-text monographs that the library offers to its users either through an individual licensing contract with the content providers or through other arrangements (e.g., regional or state consortium) where the library pays a reduced or no fee for access.

This includes electronic books purchased through vendors, such as netLibrary and Books24x7, and electronic books that come as part of aggregate services. It excludes internally digitized electronic books, electronic theses and dissertations, digitally created archival collections (e.g., Early English Books Online), and other special collections. This also excludes publicly available electronic books to which the library provides web links. It does not include machine-readable books distributed on CD-ROM, or accompanied by print books.

Rationale: Networking technology in libraries has improved and increased dramatically user access to the electronic counterparts of some traditional sources. This statistic documents the degree of expansion of e-books. In the mid 90s, networking and resource sharing technologies provided libraries with print books and e-books that were made available through a library's networks.

Because the evolving nature of this statistic will heavily depend on technological enhancements, all libraries are encouraged to use extra caution while pursuing their institutional goals, missions, and visions. Moreover, the definition of e-books is still evolving. This statistic is an early attempt to keep track of this type of resource as it becomes more widely available.

Implementation

- Collected by: Local and vendors
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures:

1. For each electronic book collection, get the electronic title counts from either the providers or catalog records. Unlike electronic full-text journals and reference databases, it is not necessary to list the titles for each electronic book collection.
2. Count any duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
3. Record the counts and be sure they are updated regularly. The library should also update the count information on the library website and/or in marketing brochures on a regular basis.

Special considerations: Do not include book collections that are a part of aggregate services and function more as a reference collection (e.g., MD Consult reference books, ProQuest's Early English Books Online, and books@OVID). They should be reported in the electronic reference databases.

Do not include freely available electronic books such as titles available from the National Academy Press.

Related issues: Electronic books, still evolving in terms of technology and adoption for use, present a number of issues in terms of definition and measurement, such as "location," accessibility (metadata and access points), and use versus circulation (e.g., is on-line use for 20 minutes a circulation, as it would be with reserve materials; or does a circulation of electronic books require a minimum period of use, such as 24 hours?).

- What about reference book collections provided by vendors? Should they be treated as electronic books, for example, or should they be treated as a database, on the grounds that they are used as databases?

Count only those books that a user can check out, as they would traditional books. Unlike traditional books that the library purchases and owns, electronic books can be subscribed to for an ongoing fee. In this case, the library accounting system may treat these as serials rather than books because of the type of payment. It is relatively easy to keep track of the number of electronic books right now since most libraries deal with only a handful of e-book vendors, such as netLibrary and Books24x7. But in the future, it will become increasingly difficult to do this as the sources of electronic books proliferate.

Finally, some provisions of contractual agreements between libraries and vendors may limit the level of use of e-books. These issues need be addressed in future research.

4.3.2 STATISTICS RELATED TO USE OF ELECTRONIC NETWORKED RESOURCES AND SERVICES

High use of a library resource or service implies a collection development program that is working to create access to the resources customers need. Use and the need can also identify resources and services that are seen as particularly valuable in the education and research enterprise and should be expanded, or perhaps resources and services that should be discontinued due to lack of use and interest. Whether provided by vendors or collected institutionally, usage statistics can help a library administrator make decisions and plan for the future in order to meet not only users' expectations and needs but also institutional goals. The reported data can also provide other information as to where and when people use the library's materials and how well the library serves its target audience and anticipates their potential needs.

The cost of providing access to networked resources and services can be more expensive than that of traditional counterparts. Depending heavily on earlier ICOLC guidelines, the E-Metrics use measures put this in the perspective of the changing academic research library environment. The purpose of the use measures is to provide statistics relating to the use of networked services and resources. Therefore, it is expected that library administrators can reconsider some resource allocation issues as the number of resources and services tend to increase while people are provided greater access. Please note that, as with most of the statistics in this study, statistics related to the use of library resources and services should be revisited and perhaps modified as the technology advances.

U1 -- Number of Electronic Reference Transactions

Definition: Number of electronic reference transactions conducted via email, a library's website, or other network communications mechanisms designed to support electronic reference. An electronic reference transaction *must* include a question *either* received electronically (e.g., via e-mail, WWW form, etc.) *or* responded to electronically. Those transactions that are both received and responded to electronically are counted as *one* transaction. This count excludes phone and fax traffic unless either the question or answer transaction occurs via the described manner. It includes the counts accrued from participation in any local and national projects, such as DigiRef and the Library of Congress's CDRS (Collaborative Digital Reference Service).

A reference transaction is an information contact, which involves the knowledge, use, recommendations, interpretation, or instruction in the use of one or more information sources by a member of the library staff.

Rationale: Libraries are making more of their services available electronically and are interested in tracking the development of a new and emerging library service. There is a need to better document this transition to facilitate and improve resource allocation activities. This statistic represents reference activities conducted electronically in the library. It is an attempt to measure reference transactions through new electronic tools.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly). This statistic can be collected in the same manner as the library gathers other reference transactions data.
- Procedures:

1. Select a typical week (or month) to run a sample study. Be sure to vary the specific week (or month) chosen over the course of a year or from year to year to account for seasonal fluctuations.
2. Key tasks include distributing a daily tally sheet, collecting the daily tally sheet, adding each day's totals to a weekly figure, and being available to respond to data collection problems should they occur.
3. Transactions may be via e-mail, a form on a web page, etc. Electronic reference transactions may involve more than reference desk staff (e.g., web master, various reference personnel, library director, volunteers, etc.). Establish an administrative procedure to report electronic reference transaction counts to a designated staff person, no matter who receives the questions or answers the reference requests.
4. Disseminate the new procedure and rationale. Several notices throughout the year may be necessary.
5. Report an electronic reference transaction as you would a face-to-face reference transaction. Thus, one e-mail request may contain several reference questions taking varying times to complete. For example, one e-mail request could contain two relatively short reference questions and one reference question that took 10-15 minutes to answer. Count the number of requests, not the number of questions. Thus, in the example you would report one (1) as the number of electronic reference transactions even though there were three questions. Report counts using pre-established local library reporting periods (weekly, monthly, etc.).
6. Indicate and describe any additional methods used outside of this definition and guidelines.

Special considerations: Unless the library uses electronic reference management software to collect and report transaction data, it is difficult to keep track of a complete reference transaction cycle (query and response) because of time-delays and the involvement of several parties.

As stated in the definition, the statistic includes the number of service transactions provided to patrons outside the university or the parent institution that the library serves, through regional or national cooperative efforts and through library policies.

Related issues: Reference services are undergoing rapid changes. Libraries are experimenting with different modes of electronic reference. One could say that simple email transactions that are prominently mentioned in the procedures are not much different from traditional reference services. How can a library measure quality in providing different types of electronic reference services such as live-chat with text/voice/video? Will this measure help the library determine user demand and thereby plan for resource allocation? To answer these questions, libraries need to collect more detailed information such as length of time taken to answer questions, types of questions by types of transactions, and so on. Also, this statistic is likely to produce some useful figures and trends regarding staff support and allocation in reference activities.

U2 -- Number of Logins (Sessions) to Electronic Databases

Definition: Number of user initiated sessions in licensed electronic resources. A session or login is one cycle of user activities that typically starts when a user connects to a database and ends with explicit termination of activities (by leaving the database through logout or exit) or implicit termination (time out due to user inactivity). Licensed electronic resources also include those databases that institutions mount locally.

Rationale: One purpose of having a networked environment is to promote connectedness and accessibility to a variety of information resources, hence the need for this measure. Also, the gradual shift in the materials expenditures from traditional print- based resources to electronic databases can be understood with the measure. This measure will produce a count of how often specific databases are used and complement traditional physical attendance counts.

Implementation: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. At least on the database title level, usage statistics should be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

- Collected by: Vendor
- Frequency: Monthly, but can be reported quarterly or annually
- Procedures:

    1. Process monthly usage statistics from vendors and copy or import the number of attempted sessions in each database (in each journal collection for full-text journals) to an in-house spreadsheet or database file.
    2. Calculate the total sessions for a given month by adding the number of sessions from each database or journal collection.

Special considerations: Not all vendors report this statistic. Therefore, it will be necessary to qualify the statistic with a sentence such as this: "We have 150,000 logins recorded from 120 databases out of 200 subscribing. We cannot report this statistic for the remaining 80 databases because the vendor does not supply login (session) information to customers."

Related issues: When analyzing the login counts, it might be important to explain any increases or decreases in the figures. Specify, for example, whether the increase comes from (1) the addition of new databases, (2) databases which did not report the statistic in the past but have now begun reporting, (3) increased demand, and/or (4) an increase in the number of simultaneous users.

Problems with the comparability of login counts from different vendors is a serious threat to the utility of the combined count. Content providers use different time-out thresholds (ranging from 7 to 30 minutes on average). Also, because of the IP-based authentication, several sessions conducted at the same public workstation can be counted as a single login. Alternatively, libraries can collect attempted logins to various licensed databases by making users go through a central gateway (which counts all attempted logins). This will ensure that one login attempt to a database is the same as a login to other databases. However, what this data collection method misses is user logins that go directly to content provider sites. It is unclear how many user logins fall into this category, but the phenomenon certainly results in a substantial undercount of user logins.

While the gross login figure is useful, it is useful only for trend plotting and gross justification of electronic resources. Within the library, the usage measures of licensed electronic resources have many users and uses. Circulation of usage statistics on the database title level (or in an extreme case on the journal title level) and discussion of any noticeable changes (or lack thereof) need to occur at various levels among the concerned parties, including collection development personnel, web master(s), technical services staff, and so on.

U3 -- Number of Queries (Searches) in Electronic Databases

Definition: Number of user initiated queries (searches) in licensed electronic resources. A search is intended to represent a unique intellectual inquiry. Typically, a search is recorded each time a search request is sent/submitted to the server.

Rationale: This statistic provides libraries with an indication of the databases that are most heavily used, areas of user interest, database popularity, and a level of usage detail that goes beyond an initial session. It also can provide important information for billing purposes, as some vendors charge for database usage by number of searches. This statistic can complement U1, the number of electronic reference transactions, as more user requests bypass staff mediations. Some portion of this statistic is also analogous to in-library use of reference sources.

Implementation

- Collected by: Vendor
- Frequency: Monthly, but can be reported quarterly or annually
- Procedures: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. Usage statistics need to be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

  1. Process monthly usage statistics from vendors and copy or import the number of attempted searches in each database to an in-house spreadsheet or database file.
  2. Calculate the total number of searches for a given month by adding the number of searches from each database or journal collection.

Special considerations: Because some vendors do not report this statistic, it will be necessary to qualify the statistic with a sentence such as this: "We have 150,000 searches recorded from 120 databases out of 200 subscribing. The other 80 do not provide this statistic."

Related issues: Different assumptions about and mechanisms for collecting search counts by different vendors are potential threats to the combined count.

U4 – Number of Items Requested in Electronic Databases

Definition: Number of items requested in all of the library's licensed electronic resources. These resources may include journal articles, e-books, reference materials, and non-textual resources that are provided to the library's users through licensing and contractual agreements. The user requests may include viewing, downloading, emailing, and printing to the extent the activity can be recorded and controlled by the server rather than browser.

The items reported depend on the type of content. Examples include citations, abstracts, tables of contents, and full-text articles (ASCII, HTML, PDF, or PS).

Rationale: This statistic provides a circulation count for electronic contents in a way analogous to the traditional circulation of books. Given the fact that libraries do not have good measurements of in-house materials usage, particularly serials usage, this statistic helps libraries understand in-library use patterns that were heretofore difficult to measure.

Implementation

- Collected by: Vendor
- Frequency: Monthly, but can be reported quarterly or annually
- Procedures: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. Usage statistics should be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

1. Process monthly usage statistics from vendors and copy or import the number of items selected for viewing, downloading, and emailing in each database. Count the number and type of items users selected: abstracts, citations, and full-texts.
2. Calculate the total number of items for a given month by adding the number of items requested from each database or journal collection.

Special considerations: Because some vendors do not report this statistic, it will be necessary to qualify the statistic with a sentence such as this: "More than 150,000 items were requested from 120 databases out of 200 subscribing. The other 80 do not provide this statistic. Among the requested items, 100,000 were some form of full-text records."

Related issues: Different vendors apply different assumptions and mechanisms in collecting items requested counts. This lack of standardization makes it difficult to calculate an aggregate count.

We do not have good measurement of in-house materials usage, particularly journal usage. However, electronic journals and databases allow libraries to find out how often materials are requested. Having in-house usage figures is important for understanding the dynamics of usage between print and electronic journals, so that we can ascertain any correlation between them.

U5--Virtual Visits to Library's Website and Catalog

Definition: This is defined as user visits to the library's website or catalog from outside the physical library premises regardless of the number of pages or elements viewed. If a user looks at 16 pages and 54 graphic images while at a website, that user registers one visit on the web server. All visits to the website should be counted regardless of repetition by one user. A visit is usually determined by a user's IP address, which can be misleading due to Internet Service Providers (ISPs) and Firewalls or Proxy Servers. Thus, this measure is actually an estimate of the visits.

Rationale: Use of the website or catalog from outside the library reflects interest in library services. The role of networked services is to expand the reach of libraries beyond their physical boundaries. This statistic helps describe the significance of networked services use by measuring the number of virtual accesses. This will also give an opportunity for the library to compare the demand placed on their networked resources with that for other popular information-oriented websites (such as Excite, Lycos, etc.).

Implementation:

- Collected by: Local
- Frequency: Reported annually, although internal reporting will be more frequent (e.g., weekly, monthly, and quarterly).
- Procedures:

  1. Identify all sources of virtual visits to the library. This may involve activities that take place on more than one web server. Some of the web servers may be owned by the library and some may be owned or maintained by another department in the university, an Internet Service Provider (ISP), or other library vendors (e.g., library OPAC provider).
  2. Exclude internal use within the premises of the library from the counts for this measure when possible. Two common approaches are using IP addresses or some form of authentication tagged to each transaction. In terms of external visits to the library, three common sources are: external access to the library's web page, remote logins (sessions) to non-web-based library databases, and remotely accessible library OPAC.
  3. Develop strategies for collecting the data from each of these sources of virtual visits. Different software may be needed to measure each electronic source of virtual visits. In some cases, the library may calculate the virtual visits using one or more log analysis software packages. In other cases, the external owner of the web server or service (the ISP) must provide the data. Discussions may need to be held with these service providers to obtain the needed data. In still other cases, custom programs may have to be developed.
  4. In the case of library web pages housed on the library server, identify, configure, and install appropriate log analysis software. Determine log analysis software definition that corresponds to the virtual visit definition.

     Note: Different log analysis software packages may count virtual visits in different ways, so the count obtained will by necessity be an estimate. Arrange with the server technical staff for regular (monthly) reporting of internal visits at the various user access Internet workstations, external library user virtual visits, and total virtual visits (internal visits plus external visits). Run the log analysis software.

5. In the case of library web pages housed on an ISP's server, identify the log analysis software the ISP uses. Determine the definition of "visit" used by the log analysis software that corresponds to the virtual visit definition with the assistance of the ISP. Arrange with the ISP for regular (monthly) reporting of internal library visits at the various user access Internet workstations, external library user virtual visits, and total virtual visits (internal visits plus external visits).
6. Where virtual visit counts include the aggregate of internal and external visits, indicate this in your report.

Special considerations: Count all visits to the website regardless of repetition by one user as long as each visit meets the criteria for this statistic.

After one user connects to the Internet, several users could conduct multiple different searches in the electronic service. In some cases, e.g., Internet-accessible OPAC use inside the library, several users, one after the other, might make use of the same established connection. In most systems, a connection is cut off after a specified period of non-use, thus solving part of the problem. The best existing method of collecting virtual visits is to use log analysis software. The log analysis software producers may define virtual visits differently. For example, does a visit end after a time-out period of 30 minutes, 15 minutes, or some other time? The recommended time-out period is 30 minutes, but a local library may have to accept the available log analysis software's definition even if it varies from the above.

Some libraries will find it difficult to report every virtual visit. For example, libraries may have difficulty counting the use of library OPACS because their vendors do not provide this information. Make a record of those sources of virtual visits not counted. Do not estimate virtual visits for which data are not available.

Related issues: This measurement requires a relatively high degree of technical skills either on staff or available from the library's website host.

4.3.3 STATISTICS RELATED TO EXPENDITURES FOR ELECTRONIC RESOURCES AND RELATED INFRASTRUCTURE

This portion of the statistics is based on the *ARL Supplementary Statistics* Survey (the most recent survey instruction available at http://www.arl.org/stats/arlstat/#sup). In collecting the statistics, the library should refer to the procedures followed and the amounts reported in response to the *ARL Supplementary Statistics* Survey.

These statistics were developed by ARL to determine expenditure patterns on electronic and networked resources and the effect of new types of library resources and services, those delivered both individually and collectively with other institutions, on library expenditures. These measures are expected to help ARL libraries justify their growing budgets due to the great expense of electronic and networked services. These measures can help answer such questions as: How much are research libraries spending for electronic resources collectively and how much on average? How do expenditures for electronic resources compare across several research libraries?

We have not included the cost of the technical staff and their training, the networking and equipment to provide access to the electronic resources as well as the time of all the staff involved. This will have to be addressed in the future.

General Introduction to C1-C3

The report should include expenditures for electronic indexes and reference tools, electronic full-text periodical collections and electronic journal back-files, and online searches of remote databases – whether accessed remotely or installed locally from CD-ROM, magnetic tapes, etc. The report should also include expenditures for materials purchased jointly with other institutions if such expenditures can be separated from other charges for joint services, fees paid to bibliographic utilities if the portion paid for computer files and search services can be separately counted, and equipment costs when they are inseparably bundled into the price of the information product.

Expenditures for bibliographic utilities, networks, and consortia that are unrelated to end-user database access should be reported in C4, not in C1 through C3.

C1 -- Cost of Electronic Full-Text Journals

Definition: Expenditures for electronic full-text journal subscriptions that the library provides to its users. Include both initial purchase cost, membership fees (such as JSTOR) as well as annual access and service fees paid directly or through consortia arrangements.

Rationale: This statistic, cost of electronic full-text journals, was developed by ARL to find out how much libraries are spending on electronic full-text journals and how new forms of electronic journals are replacing traditional journals and scholarly publications. It also indicates the extent of budget allocations for electronic resources. Furthermore, this statistic allows libraries to calculate unit costs of e-journals after collecting C1 and R1 statistics, and thus aids libraries in deciding how effectively they are serving their potential and intended audiences, and in benchmarking with the other institutions.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures: For the definition of electronic full-text journals, please refer to the definition of R1. Current library accounting systems do not support coding of materials expenditures by the categories used in the manual. Therefore, it may become necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics. Significant coordination is required for setting up the structure of the file, but in the long run may streamline many aspects of the management of electronic licensed materials.

  1. Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office.
  2. If you have not done so, organize the data using the sample worksheet in Appendix C, Figure C.1.

3. Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
4. If a fee is paid to a consortium or other joint arrangement, include the amount. In the case where a fee is paid for an aggregate service and the service contains different categories of resources (full-text journals and reference sources) as a bundle, use an estimate based on expected or historical use, or list prices.
5. Note any major commitments (such as JSTOR one-time costs) that do not occur year to year and that significantly influence the reported amount.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources at *a given point in time* (most likely at the end of the reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but can be very time consuming. You can report the annual amount paid without prorating on the basis that over the years the figures will even out.

Some electronic full-text journals come either as a free service with a print subscription or as part of a print-plus-online-access subscription (the library pays extra for electronic access). In the first case, the problem is whether or not to post any amount for the cost of electronic access. In the latter case, the question is how much of the cost can be attributed to electronic access.

C2 -- Cost of Electronic Reference Sources

Definition: Expenditures for electronic reference sources and aggregate services that the library provides to users either through individual licensing contracts with content providers or through consortia or other arrangements where the library pays some fees. These fees include both annual access fees and other service costs paid to the vendor directly or through consortial arrangements.

Rationale: This statistic, cost of electronic reference sources, was developed by ARL to determine how much libraries are spending on electronic reference sources and how new forms of electronic reference sources are replacing traditional reference materials. It also gives insight into shifts in budget allocations from print to electronic materials, or new allocations exclusively for electronic materials. Furthermore, this statistic allows libraries to calculate unit costs of electronic reference sources after collecting C2 and R2 figures. This figure assists libraries in making decisions about how effectively they are serving their potential and intended audience, and in benchmarking with other institutions.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures: For the definition of electronic reference sources, please refer to the definition of R2. For libraries that do not have acquisitions systems which support coding of materials expenditures by the categories used in the manual, it may be necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics.

1. Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office.
2. If you have not done so, organize the data using the sample worksheet in Appendix C, Figure C.1.
3. Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
4. If a fee is paid to a consortium or through other joint arrangement, include the amount. If a fee is paid for an aggregate service and the service contains different categories of resources (full-text journals and reference sources) as a bundle, use an estimate based on expected or historical use, or list prices.
5. In the comments field of the sample worksheet (Appendix C, Figure C.1), report any major commitments that do not occur year to year and that significantly influence the reported amount.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources *at a given point in time* (most likely at the end of reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but can be very time consuming. You can report the annual amount paid without prorating on the basis that over the years the figures will even out.

C3 -- Cost of Electronic Books

Definition: Expenditures for electronic full-text monographs that the library offers to its users. Include both initial purchase costs and membership fees as well as annual access and service fees paid directly or through consortia arrangements.

Rationale: This statistic, cost of electronic books, was developed by ARL to determine how much libraries were spending on electronic books. It also gives an idea about the extent of budget allocations for electronic resources. Furthermore, this statistic allows libraries to calculate unit costs of e-books after collecting C3 and R3 statistics, aids them in determining how effectively they are serving their potential and intended audiences, and assists them in benchmarking with other institutions.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)
- Procedures: For the definition of electronic books, please refer to the definition of R3. Current library accounting systems generally do not support coding of materials expenditure by the categories used in the manual. [See note for 3.2.4.5] Therefore, it may become necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics.

1. Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office. You may also need to review circulation records to verify the accuracy of invoices if additional per-use fees are paid (royalty on use, as with E-reserves).

2. If you have not done so, organize the data using the sample worksheet in Appendix C, Figure C.1.
3. Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
4. If a fee is paid to a consortium or other joint arrangement, include the amount.
5. Note any major commitments (such as netLibrary purchase costs) that do not occur year to year and that significantly influence the reported amount.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources at *a given point in time* (most likely at the end of reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but it can be very time consuming. You can report the annual amount paid without prorating with the rationale that over the years the figures will even out.

Traditionally books are purchased on a one-time payment in exchange for permanent ownership by the library. However, with regard to electronic books, it appears that some arrangements allow libraries to subscribe to an e-book collection at a predetermined fee and for a predetermined interval of time. We are concerned with the format of the material, not the subscription or payment arrangement. These materials should be counted as books, not serial publications.

Related issues: In many instances, the physical form of the material (print, electronic) may change the nature of the object. An electronic book is a good example. With enhancements such as full-text searching (although print books too have some search capability through tables of contents and indexes), electronic books support new forms of searching not present in print.

C4 -- Library Expenditures for Bibliographic Utilities, Networks, and Consortia*

Definition: Expenditures paid by the library for services provided by national, regional, and local bibliographic utilities, networks, and consortia such as OCLC, RLG, *excluding fees paid for user database access and subscriptions*, which should be reported in C1 through C3.

Rationale: This statistic is based on the *ARL Supplementary Statistics* Survey. It was developed by ARL to determine how much money libraries spend for bibliographic utilities, networks, and consortia. Because individual libraries often have to deal with special provisions and funding issues related to contracts, this statistic may not lend itself to comparability among ARL member libraries. Nevertheless, it represents an attempt to keep track of the financial relationships between bibliographic utilities and libraries. Although this may provide very limited comparability, it is an estimate of the cost of bibliographic utilities, networks, and consortia.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

---

* This corresponds to item 3a in the *ARL Supplementary Statistics*

- Procedures:

1. Gather reports and invoices with bibliographic utilities, networks, and consortia of which the library is a member for the whole or part of the reporting period. These documents are typically handled by the library's accounting office.
2. Identify only those expenditures paid to the bibliographic utilities, networks, and consortia for membership, maintenance, and other infrastructure. Do not include expenditures that are directly attributable to access of electronic resources. Those expenditures should be included in C1 through C3.

   For instance, if your library paid a total of $100,000 to OCLC for its various services and your best guess of electronic database access portion of the services is 80%, then you should report $80,000 for C2 and the remaining $20,000 for C4.

3. Even if a membership or consortium period is different from the reporting period, use the amount of the membership or consortium agreement.
4. Use the sample form in Appendix C, Figure C.2 to compile the expenditures.

Special considerations: Prorating can be time consuming. Consortia or other memberships may bring additional benefits, such as subscriptions, training or preferential pricing for acquisition of materials. It may be difficult to separate pure membership fees from value-added services of membership (e.g., original catalog credits from OCLC that may be used to offset costs of databases, purchase of catalog records, etc.). Report the annual amount paid without prorating with the rationale that over the years the figures will even out.

C5 -- External Expenditures for Bibliographic Utilities, Networks, and Consortia[*]

Definition: Expenditures paid by external agencies, such as state government agencies, on the library's behalf for access to computer files, electronic serials, or search services through a centrally funded system or consortial arrangements. Examples include state- (or province-) supported networks such as VIVA (Virginia), CNSLP (Canadian National Site Licensing Project), and the University of California's California Digital Library Expenditure.

Rationale: Like statistic C4, this statistic is based on the *ARL Supplementary Statistics* Survey. It was developed by ARL to determine how much money is spent for bibliographic utilities, networks, and consortia on libraries' behalf for access to computer files, serials, and/or services through consortial arrangements. Because of contractual issues, this statistic may provide little comparability among ARL member libraries. Nevertheless, it can give ARL members an estimate of the external costs of bibliographic utilities, networks, and consortia.

Implementation

- Collected by: Local and external bodies such as regional and academic consortia
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly).

---

[*] This corresponds to item 3b in the *ARL Supplementary Statistics*

- Procedures:

1. Gather reports and invoices with bibliographic utilities, networks, and consortia that are related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office. However, they can be maintained outside the organization and, in some instances, may only be provided to libraries upon demand.
2. Find out how much of the central funding is attributable to your library. For example, if your library contributes a total of $60,000 over a period of three years to a state consortium that has a matching contribution of $120,000 for the same period, the amount to report as C5 for a given year during the three-year period will be $40,000 ($120,000 x 1/3). The library's contribution ($60,000) has to be divided annually and posted in C1 through C3.

   If the specific dollar amount is not known, but the total student FTE for the consortium and the amount spent for the academic members are known, divide the overall amount spent by your institution's share of the total student FTE. Alternatively, if the consortium is comprised of different types of institutions (academic, public, or corporate), but the library has information about the portion of its own use among the consortium participants, multiply the total amount by the percentage of known (or estimated) usage rate.

3. As a last resort, consult with a staff member overseeing the consortium or the central funding system to get an estimate of the portion of the central funding that is attributable to the library. Please make a note of this in the comments field in the sample worksheet (Appendix C, Figure C.3).
4. Use the sample form in Appendix C Figure C.3 to compile the expenditures.

4.3.4 STATISTICS RELATED TO LIBRARY DIGITIZATION ACTIVITIES

Comprised of resource and use measures, the digital collection measures attempt to describe where libraries are in creating and making available local (perhaps unique) content that may not have been previously accessible. Such collections can attract students and faculty to your university and thereby enhance the institution's reputation. As more libraries digitize resources, more users will be able to retrieve those unique resources at anytime and from anywhere. Digital library projects, as well as other network resources and services, also will serve increasing numbers of students taking courses online.

Collecting library digitization measures may provide an opportunity for benchmarking and may encourage libraries to devote more time and allocate more resources to this worthwhile endeavor. It should be noted that these statistics represent a very early attempt to measure digitization of resources; as time passes and the technology advances, some of the definitions and procedures may need to be revisited and modified. During the field-testing it was reported that storing and maintaining digitized resources had been an issue. The unavailability of an appropriate infrastructure in some institutions meant that the project did not include statistics related to library digitization projects.

Libraries archive the scholarly output of their institutions – theses and dissertations – in both paper and digital form. Digital collections also provide new opportunities with faculty to archive research results. These statistics, although preliminary, form a basis for tracking these issues.

D1 -- Size of Library Digital Collection

Definition: Library digital collection refers to digital materials (texts, images, and audio-visuals) created in or converted from different formats (e.g., paper, microfilm, tapes, etc.) by the library and made available to users electronically. This includes electronic theses and dissertations (ETDs), special collections materials, maps, sound recordings, films, and other digital materials that are not purchased or acquired from outside through individual or consortial licensing agreements. Includes the number of titles and size (in gigabytes) by sub-categories (ETD, visual materials, texts, multimedia), and as an aggregate at the end of the reporting period. Also includes the number of items (titles) added during the reporting period.

The types of formats in Appendix C, Figure C.4, refer to original formats rather than the digitized outputs. Examples of visual materials include photos, maps, and postcards. Examples of text include books, journal articles and pamphlets. Examples of multimedia include audio, video, and other interactive materials. However, this statistic does not include any back up copies or mirror sites because items should be counted only once.

Rationale: Collecting library digitization measures may provide an opportunity for benchmarking in terms of file sizes for the resources that have been digitized. Moreover, the statistic can demonstrate that libraries are not merely brokers of external information resources, but also producers of information content and useful finding aids.

This statistic provides information on the extent of digital library projects, the life cycle of such projects, and the "virtual space" requirements of such collections.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures: For cases in which multiple digital formats (derivatives) were produced from an item, count it only once based on the type of item that was digitized. For example, if a 100-page book was digitized in 100 TIFF files, each containing a page, a 100-page PDF file, and 10 PDF files (one PDF file for each of 10 chapters), count it as a single text with 100 pages. If a derivative item was used as the source, do not count the outputs. But in the total size (in gigabytes) include all versions of derivatives.

1. Designate a staff member to coordinate the collection of this statistic. The person should be well aware of library digital collection activities.
2. Identify library staff in charge of various digital library projects and initiatives.
3. It is necessary to conduct an inventory of digital material stock using the sample tally worksheet in Appendix C, Figure C.6 if it has not been done already. If this inventory information is already available, enter it into the worksheet. When the inventory is completed, summarize the information using the sample worksheet in Appendix C, Figure C.4. Add additional categories if necessary.
4. After obtaining the inventory information, ask staff members to keep track of additional output regularly using the sample tally worksheet in Appendix C, Figure C.6.

5. At the end of the reporting period, collect the worksheets and calculate the total production during the reporting period using the worksheet in Appendix C, Figure C.5. Add additional categories if necessary.

Related issues: Realistically, each digital collection is unique in terms of the production process, the way it is intended to be used, its focus, and maintenance. It is important to use appropriate units of measurement to describe the overall size and extensiveness of the whole collection.

Because of the wide variations of the types and features of digital collections constructed at ARL institutions, this statistic may be more useful locally than for comparison across ARL member libraries. Benchmarking may, however, be possible from the data collected to produce some qualitative and quantitative indicators as to the extent of digital library collection activities and different emphases across the ARL membership.

D2 -- Use of Library Digital Collection

Definition: Number of times library digital collection titles and physical files were accessed and the number of searches (queries) conducted (if there is such a capability) during the reporting period.

Rationale: Each digital collection is unique in terms of its focus, production process, and the ways it is intended to be used and maintained. Therefore, because of the wide variations of the types and features of these library collections constructed at different ARL institutions, this statistic needs to be collected and used locally instead of across ARL member libraries. Nevertheless, this statistic has the potential to produce some qualitative and quantitative indicators as to how these collections are being used and serving the intended user community's needs.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures:

1. Designate a staff member to coordinate the collection of this statistic. The person should be well versed in the use of web log software and/or statistics provided by the software. This person will act as a liaison for staff members who are responsible for managing library digital collections. Obtaining the statistic may require some level of programming (e.g., Unix scripting and SQL).
2. Items accessed can be collected in various ways, and depending on your library's environment, your library may need to collect different access statistics.

   Although you are asked to collect both title access and physical file access, if it takes too much time and effort to collect the title access, report the physical file access count only. For example, a book can be digitized and made into 10 PDF files, each containing a chapter, for access. Suppose a user viewed five PDF files out of 10. In this case, you will have five physical item accesses and one title access. Usually it is easier to have a physical item access count, while it takes custom programming to compute the title access count as most off-the-shelf web traffic software packages do not provide this.

Do not report web page hits. Instead, count how many times the digitized items were accessed (the exact name for item access may vary depending on the type of web traffic analysis software being used in the library).

If a search capability is a feature of a library digital collection, the total number of searches submitted needs to be collected. A search represents an explicit user request for specific information in a database and is expressed usually in the form of word strings. Clicks on web page buttons, such as "Next" and "Previous," do not count as user searches.

You might want to install web traffic analysis software (e.g., WebTrends, Web Tracks) on the library web servers housing library digital collection materials, if the web servers do not have such software already. You might want to consider installing a trial version that gives between 30-180 days of free trial.

Read the description of reported statistics carefully and make sure that the software provides what you want.

3. If continuous collection of use statistics is not possible or desirable, select a typical week (or month) to run a sample study. Be sure to vary the specific week (or month) chosen over the course of a year or from year to year to account for seasonal fluctuations. Extrapolate based on the sample data.
4. At the end of the report period, use the log analysis report to calculate the number of accesses to library digital collection items. Use the sample report in Appendix C, Figure C.7, to organize the information.

Special considerations: To the extent possible, exclude accesses by web search spiders. Also, do not include accesses to auxiliary (or incidental) items that are not part of the library digital collection content (.gif buttons and image maps for navigation). Note the method used and include a description of any filtering done.

Related issues: This statistic needs to be collected and used locally instead of across ARL member libraries because of the wide variations of the types and features of digital collections constructed at ARL institutions.

D3 – Cost of Digital Collection Construction and Management

Definition: Annual direct costs (personnel, equipment, software, contracted services and similar items) spent to create digital materials (texts, images, and multimedia) or to convert existing materials into digital form for the purpose of making them electronically available to users. Include expenditures related to digitization, OCR, editorial, creation of markup texts, preparation of metadata for access to digitized materials, data storage, and copyright clearance. Exclude expenditures for information resources purchased or acquired from outside the institution through individual or consortial licensing agreements.

Rationale: The cost of each digital collection construction may vary significantly, depending on the size of the collection, conditions of the sources before digitizing, available infrastructure, staff allocation, timeline, and administrative support. This statistic should be collected and used locally instead of across ARL member libraries because of the wide variability among these library collections constructed at different ARL institutions. Nevertheless, this statistic has the potential to provide quantitative indicators as to how costly these efforts are, how much resource allocation (i.e., budget allocation, staffing, infrastructure, etc.) is needed, and how well they serve the intended user community's needs (e.g., to account for internal and external costs to construct and manage digital collections at ARL libraries).

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- Procedures:

1. Designate a staff member to coordinate the collection of this statistic.
2. Direct the designated staff member to contact library staff members who are in charge of digital collection projects. Ask all library staff members involved in any digital collection projects as part of their official responsibilities to fill out the worksheet in Appendix C, Figure C.8, for the reporting period. Ask them to estimate how much of their time was spent on planning, implementing, and managing digital collection projects. This information will be entered in the worksheet as FTE (full-time equivalent). A further breakdown of activities may be necessary if the library wants to have more detailed information on the distribution of efforts.

   Note that annual salary should not be asked of the staff members filling out the worksheet and should not include fringe benefits. When all the worksheets are collected, the salary information will be obtained from the library accounting or personnel department. Direct staff cost will then be calculated.

   The personnel cost should also include wages paid to non-salaried staff, including student and other hourly workers.

3. Cost of equipment should be amortized. For example, if a $3,000 scanner was purchased at the beginning of the reporting year and has a depreciation period of three years, register $1,000 as the equipment cost. Costs of software should be reflected in full amounts based on the time of the purchase.
4. If a subcontracting period is different from the reporting period, prorate the amount for the reporting period. If the payment is based on percent to completion, include only the amount that belongs to the reporting period.
5. Use the sample worksheet in Appendix C, Figure C.9, to calculate the total cost.

Related issues: This statistic needs to be collected and used locally instead of across ARL member libraries because of the wide variations of the types and features of digital collections constructed at ARL institutions.

4.3.5. ANALYSIS OF SUGGESTED PERFORMANCE MEASURES

The overall rationale for the performance measures in this study is to provide a means for measuring the proportion of services delivered through traditional channels relative to analogous services delivered through electronic channels. These measures will help document trends in service delivery for the purpose of allocating staff and development resources as well as identify trends for strategic planning of service delivery.

P1 - Percentage of Electronic Reference Transactions of Total Reference

Definition: Percentage of annual electronic reference transactions to total reference transactions. An electronic reference transaction *must* include a question *either* received electronically (e.g., via e-mail, WWW form, etc.) *or* responded to electronically. Count excludes phone and fax traffic unless either the question or answer transaction occurs via the described manner. It includes the counts accrued from participation in any local and national projects, such as DigiRef and the Library of Congress's CDRS (Collaborative Digital Reference Service).

Total reference = Traditional reference counts (include face-to-face reference transactions, telephone and fax reference counts) + electronic reference transaction counts

$$P1 = \frac{\text{Number of Electronic reference transactions (U1)}}{\text{Total reference transactions}} \times 100$$

Rationale: The purpose of having a networked environment is to promote connectedness. This measure provides an indication of a changing library environment. While in the traditional library environment reference transactions were handled mainly through non-electronic means, in the current environment reference transactions can be handled via various electronic means over the Internet. By having this as a measure, libraries are able to track the development of a new and emerging library service and have a number that fully represents reference activities. This measure may indicate how often various electronic applications are used in any given period and also assist decision-makers in reallocating resources. Moreover, this performance measure will give administrators trend data on how network services are being used and this data can then be used for future planning.

Implementation

- Collected by: Local
- Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)
- Procedures:

1. If continuous collection of this statistic is not possible or desirable, select a typical week (or month) to run a sample study. It is recommended that you sample a week in a different month or several months to account for seasonal fluctuations. Extrapolate based on the sample data.
2. Designate a staff member to coordinate the collection of this measure. Key tasks include distributing a daily tally sheet, collecting the daily tally sheet, adding each day's total to a weekly figure, and being available to respond to data collection problems should they arise.
3. For electronic transactions, use the count obtained by following the procedures for U1. See Table 2.7 or section 3.2.2.1 of this report for additional information on U1.
4. Total the overall number of transactions.
5. Divide the number of electronic reference transactions by the total number of transactions.
6. Multiply by 100.
7. Indicate and describe any additional methods used outside of this definition and these guidelines.

Special considerations: Count the number of transactions, not the number of questions. That is, if one request is emailed with three questions, it should be counted as one transaction, not three.

P2 -- Percentage of Virtual Library Visits of All Library Visits

Definition: Number of virtual library visits out of all library visits.

A *virtual library visit* is when a user visits the library's website or catalog for any length of time or for any purpose from outside the physical plant of the library, regardless of the number of pages or items viewed or requested. The term "virtual visit" excludes in-library visits where a patron or a staff member uses electronic resources. If a user looked at 16 pages and 54 graphic images while at a website, that user registers one visit on the web server. A visit is usually determined by a user's IP address. Due to various server management issues and differing software, this measure is an estimate of the visits to the library site.

All library visits is the total of the number of virtual library visits plus the number of physical visits to the library including branches.

$$P2 = \frac{\text{\# virtual library visits}}{\text{Total library visits}} \times 100$$

Rationale: People accessing the website or catalog from outside the library will reflect interest in library services. The idea of having network services is to expand the reach of libraries beyond their physical boundaries, and this performance measure can provide information about how far network services are reaching. This figure will also show the use of the library outside the regular place of business, which will be a more accurate depiction of library use. Having this measure is important to show the continued relevance of library service if physical attendance figures decrease.

Implementation

- Collected by: Local and/or vendors
- Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)
- Procedures:

1. Obtain the virtual library visits count using the procedures for U5 (virtual library visits).
2. Obtain physical attendance count from turnstile counts or swipe card records. To the extent possible, collect comprehensive data from all library branches.
3. Combine the virtual visit count and the physical attendance count.
4. Divide the number of virtual library visits by the total library visits.
5. Multiply by 100. For example, a library had 1,000 external virtual visits and 9,000 physical visits for a total visit composite measure of 10,000. 1,000 virtual visits divided by 10,000 total visits equals .10 (or 10%).

P3 -- Percentage of Electronic Books to All Monographs

Definition: Percentage of the number of electronic books available to users (through either an individual licensing contract or other consortial arrangements) to all the library's monographs.

Rationale: Networking technology in libraries continues to improve, thereby increasing user access to electronic counterparts of some traditional sources. In the mid 90s, networking and resource sharing technologies facilitated print and e-book access through library networks. This performance measure attempts to document the degree of expansion of e-books to all monographs. Libraries should use caution while collecting this measure because the definition of e-books is itself still evolving. This statistic is an early attempt to keep track of this type of source that is becoming increasingly available.

Implementation

- Collected by: Local and vendors
- Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)
- Procedures:

  1. Identify all types of monographic materials. Use in-house record-keeping sources and other library sources to determine the number of all monographs, including electronic books, non-electronic books, and other monographic materials.
  2. Identify electronic book types, including electronic books and electronic full-text aggregate services, using the sources in step 1 of the procedures for R3.
  3. Count individual electronic book titles. Record the number of individual electronic books from the spreadsheet or record the number from another source.
  4. Exclude electronic reference books, i.e., publicly available electronic books that are accessed for free.
  5. Calculate the total number of all monographs, including electronic books, non-electronic books, and other monographic materials.
  6. Divide the number of electronic books by the number of all library monographs (electronic and non-electronic monographs).
  7. Multiply by 100.
  8. Indicate and describe any additional methods used outside of this definition and guidelines.

REFERENCES

Association of Research Libraries (ARL). (2001, May). *ARL membership criteria index.* Available at http://www.arl.org/stats/factor.html.

Association of Research Libraries (ARL). (2001, October). *ARL Supplementary Statistics 1999-2000.* Washington, DC: Association of Research Libraries.

Bertot, J. C. (2001). Service quality in the networked environment. *Library Trends, 49*(4), 758-775.

Bertot, J. C., and McClure, C. R. (1998). Measuring electronic services in public libraries: Issues and recommendations. *Public Libraries, 37*(3), 176-180.

Bertot, J. C., and McClure, C.R. (1996). *Sailor network assessment final report: Findings and future Sailor network development.* Baltimore, MD: Division of Library Development and Services, Maryland State Department of Education.

Bertot, J. C., McClure, C. R., and Ryan, J. (2001). *Statistics and performance measures for public library networked services.* Chicago, IL: American Library Association.

Bertot, J. C., McClure, C. R., and Ryan, J. (2000). Developing national library network statistics and performance measures for U.S. public libraries: Issues, findings, and recommendations. *Performance Measurement and Metrics: The International Journal for Library and Information Services, 1*(1), 15-42.

Blixrud, J. (1998, April). Special issues in research library measurement. *ARL, 197.* Available at http://www.arl.org/newsltr/197/issues.html.

Blixrud, J. & Jewell, T. (1998, April). Understanding electronic resources and library materials expenditures: An incomplete picture. *ARL, 197.* Available at http://www.arl.org/newsltr/197/expend.html.

Kyrillidou, M. (1998, April). An overview of performance measures in higher education and libraries. *ARL, 197.* Available at http://www.arl.org/newsltr/197/overview.html.

Kyrillidou, M., & Crowe, W. (1998, April). In search of new measures. *ARL, 197.* Available at http://www.arl.org/newsltr/197/newmeas.html.

Kyrillidou, M. (2000, December). Research library spending on electronic scholarly information is on the rise. *ARL, 213.* Available at http://www.arl.org/newsltr/213/spend.html.

Lakos, A. (1999). The missing ingredient – culture of assessment in libraries. *Performance Measurement and Metrics: The International Journal for Library and Information Services, 1*(1), 3-7.

Lindauer, B. (1998) Defining and measuring the library's impact on campuswide outcomes. *College & Research Libraries, 59*, 546-70.

Luther, J. (2000). *White paper on electronic journal usage statistics.* Washington, DC: Council on Library and Information Resources. Available at http://www.clir.org

NCLIS Focus Group Meeting. January, 2001. Available at http://www.nclis.gov/statsurv/FINALRPT.NCLIS.vendor.FG.1.11.01.doc

Shim, W., McClure, C. R., & Bertot, J. C. (2000, December). Data gathering practices in the networked environment. *ARL*, 213. Available at http://www.arl.org/newsltr/213/data.html

Snowhill, L. (2001). "E-books and Their Future in Academic Libraries. *D-Lib Magazine* 7 (7/8). Available at http://www.dlib.org/dlib/july01/snowhill/07snowhill.html

Sottong, S. (2001). "E-Book Technology: Waiting for the 'False Pretender'," Information Technology and Libraries, 20 (2), 72-8. Available at http://www.lita.org/ital/2002_sottong.html.

APPENDICES

Appendix A: Study Proposal

Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources for ARL Libraries:

STUDY PROPOSAL

Charles R. McClure <cmcclure@lis.fsu.edu>, Francis Eppes Professor, and
Director, Information Use Management and Policy Institute
School of Information Studies
Florida State University
April 28, 2000

The Need for Action

The rapid changes – and advances – in delivering information services and resources electronically pose critically important challenges to the Association of Research Libraries (ARL). These new techniques in the delivery of electronic and networked information have left many ARL libraries with inadequate data to make a range of decisions to provide cost-effective and high quality electronic services to their users. Basic questions such as the following have yet to be adequately answered:

- What methods can be developed to determine who are the users, what are the uses of electronic information services and resources delivered by ARL libraries, and what is the frequency of that use?
- How can ARL libraries obtain timely, reliable, comparable, and useful data from database vendors that describe uses and users of the databases? And, how can ARL libraries affect the process that determines the types of data they received from the database vendors?
- To what extent can electronic information services and resources be linked to a range of library and higher education outcomes?

As demonstrated at the ARL Scottsdale meeting on New Measures in February 2000, a number of ARL libraries are working on these and related questions. The methods being developed, however, to answer these and related questions are not coordinated and are unlikely to be generalizable across the spectrum of ARL libraries.

- The study prospectus described here provides a three-phased approach to answer these and other questions regarding statistics and performance measures in the delivery of electronic services and resources. Upon the successful completion of the study ARL libraries will have:
- A report that summarizes the current "state of the art" of best practices in ARL libraries for collecting and reporting statistics and performance measures related to electronic resources and services. This report will include *practical* suggestions and techniques that will be of use to ARL libraries for describing electronic services and resource use and users.
- A set of statistics and performance measures that describe electronic information use, users, costs, and staffing. These statistics and measures can assist ARL administrators make better decisions regarding deployment, use, and purchase of electronic services.
- A short, concise manual that describes possible procedures for how to collect, analyze, and report data to produce such statistics and performance measures. The manual will stress practical and usable techniques that can be used in ARL libraries as well as identify key issues to consider when using such statistics.
- A one-day workshop for interested ARL staff offered by members of the study team that will introduce the manual, describe how best to use it, and discuss issues that should be considered in the use of the manual.

- A process to collaborate with database vendors to develop, refine, and create statistics and performance measures needed to describe database use, users, and costs. The objective of this process is to ensure that database vendors understand the need and importance of ARL libraries obtaining reliable and comparable use and user data describing database use and users.
- Models that link and describe relationships and possible impacts between electronic services and resources and higher education outcomes. These models will attempt to show where and how electronic services and resources contribute to accomplishing selected higher education outcomes.

These products will be a first set of tools, processes, and techniques that will assist ARL libraries (1) better meet the needs of their users, and (2) make better decisions regarding the purchase, use, and deployment of electronic services and resources.

Leveraging Existing Knowledge

There is a limited number of writings and still less research available regarding the development of statistics and performance measures for the academic networked environment. This prospectus does not provide an overview of these writings – many of which are listed on a bibliography on the New Measures webpage at http://www.arl.org/stats/newmeas/e-usage.html. Generally, the literature identifies a range of issues and problems regarding the development of such statistics. The literature does not, however, adequately represent the practical knowledge and current practice in this area – which was identified at the February 28-29, 2000, ARL conference in Scottsdale.

There is expertise outside the published literature that can be leveraged by this project. The author has been working to develop networked statistics and performance measures for public libraries under a project funded by the Institute for Museum and Library Services (IMLS) http://www.albany.edu/~imlsstat/. Currently, a number of statistics and measures are being field tested – some of which would have clear applicability to academic libraries. Further, the project has established important contacts and meetings with a number of database vendors to discuss the range and types of data that they might provide to state and public libraries.

In addition, the author is working with the National Commission on Libraries and Information Science (NCLIS) on the project, *Testing National Public Library Electronic Use and Network Performance Measures* http://www.nclis.gov/libraries/lsp/statist.html. Building on the IMLS study, additional work is envisioned to meet and collaborate with database vendors to determine the types of data that can be reasonably obtained for libraries. Academic libraries' direct and formal involvement to participate in and extend these efforts to address academic library database statistical needs and issues could build on existing work and demonstrate the interest and concern of the ARL community.

BACKGROUND

This study prospectus has been under development since fall 1999 when the author discussed the possibility of such a study with ARL staff and members of the New Measures Initiative http://www.arl.org/stats/newmeas/newmeas.html. Given an initial level of interest with leaders in the New Measures Initiative and ARL staff, a preliminary project prospectus was presented for discussion at a meeting held in conjunction with the December 1999 Coalition for Networked Information (CNI) meeting in Phoenix.

Based on discussions and interest from the meeting at CNI, McClure re-drafted the prospectus and it was distributed to a number of ARL members and posted at the ARL website. Leaders of the New Measures Initiative with ARL staff organized a meeting on February 28-29, 2000, to discuss the appropriateness of working in the area of developing statistics and performance measures for networked information services and resources. Seventy participants discussed aspects of the project at the meeting and provided guidance and suggestions for a study. This Study Prospectus is based on the discussions and outcomes from that meeting.

A CHANGING CONTEXT

Clearly, the context for delivery of library services and resources is changing to an electronic environment. While there has been considerable discussion about the need and importance of developing statistics and performance measures to describe networked and electronic services and resources, a unified research strategy is needed to move forward on this topic.

The Key Term

The working definition of *network-based information services* is: Those electronic information resources and/or services that users access on-site in the library, from their office, dorm, or home, or from regional/statewide networks. Examples of electronic networked resources include: local, regional, or statewide library hosted or authored web sites or library-licensed databases (e.g., Infotrac, SearchBank, EbscoHost). Especially important are statistics that describe the use of unique and often-times interactive remote scientific and technical databases.

Examples of electronic networked services include: provision of access to networked services such as email, listservs, online reference/assistance, and training in the use of these resources and services. In addition, libraries increasingly provide interactive services such as requesting services via online forms (interlibrary loans, etc.). It is likely that the term "networked information resources and services" will continue to evolve as the network evolves and as the study progresses.

Growth in Electronic Services and Resources

The move to a networked environment has significantly increased the range of services and resources that the library provides its users. The library has become a 24 hour a day access point to information services where users obtain services and resources on *their* terms and when *they* want such services – oftentimes *not* coming to the library physically nor interacting directly with library staff. The costs to provide these networked services and resources, however, can be significant. Librarians' inability to develop reliable and accurate methods to describe these services and costs injures their ability to make good resource allocation decisions, meet user needs, and develop strategic plans for the development and operation of electronic services and resources.

On an experiential basis, most ARL librarians will describe the use of their networked information services with terms such as "exponential growth" or "we can't keep up with demand." At the same time, a number of ARL libraries have also seen stagnant or declining statistics of traditional indicators of library service such is turn-stil counts, in-house reference transactions, circulation, etc. While there is a need to develop new statistics such as "virtual visits," "full-text downloads," "electronic reference transactions as a percentage of all transactions," etc., there is little agreement on how to compute such statistics and measures.

Example Possible Statistics

The work done by the author and others in the IMLS project, individual ARL libraries, as well as work under way with the NCLIS study suggest that a number of statistics describing networked and electronic services and resources may be developed in the following areas:

- Count of electronic reference transactions.
- Virtual visits (sessions) to the library's website.
- Counts of high-use and low-use web pages.
- Count of sessions on specific databases.
- IP addresses for sessions on specific databases.
- Time per session on specific databases.
- Turn-aways per time period per specific database.
- Primary use of selected electronic services and resources.
- Hours of user training on electronic services by library staff.
- Cost per session on specific databases.
- Count of full text downloads per time period per database.

- File size of full text downloads per time period per database.
- Count of on-site versus remote sessions per database.

These proposed statistics are illustrative only. Yet to be accomplished is agreeing on definitions and data collection methods to produce reliable and valid statistics, determining the degree to which such statistics can also be comparable across different libraries, and making linkages between such statistics and higher educational outcomes. In short, considerable work has yet to be done.

Issues and Challenges

Some of the factors militating against the development of networked statistics and performance measures include the following:

- Librarians do not control access to and use of a range of data that describe vendor-supplied information services and resources. Some vendors are unwilling or unable to provide the types of statistics and use data that librarians request. Statistics and measures for database use and services, nonetheless, are essential.

- The rapidly changing nature of the networked environment also affects the types of services and resources that can be provided by libraries. As the networked services change, new types of statistics and measures may be needed.

- The level of effort needed to collect, analyze, and report data to produce statistics and performance measures for the networked environment may be greater than that needed to produce more traditional statistics.

- Sometimes networked services costs and use may be difficult to "unbundle" if the library obtains these services through a consortium. Costs can either be hidden or be extremely difficult to allocate to individual libraries.

Librarians may be entering a period of time where statistics and measures for networked services may be useful for two-four years and then will have to be re-developed or discarded. Such an environment is quite different than the statistics-collecting environment in which academic libraries previously existed. Despite these concerns and factors, ARL libraries need to move forward and learn how best to produce and use such statistics and measures in this new environment.

Project Goals and Research Questions

One key goal of this project is to develop, test, and refine selected statistics and performance measures to describe electronic services and resources in ARL libraries. A second goal is to engage in a collaborative effort with selected database vendors to establish an ongoing means to produce selected descriptive statistics on database use, users, and services. A third goal of the project is to develop a proposal for external funding to maintain the development and refinement of networked statistics and performance measures. More specifically, the project has the following research questions:

- What existing techniques and approaches are being used by ARL libraries to produce statistics and performance measures to describe networked information services and resources? What can be learned from these techniques that could be generalized to other libraries?

- For what purposes and for what audiences are networked statistics and measures needed?

- Which types of networked services and resources should be described, how should they be defined and operationalized, and how should the data be collected to insure reliable and valid data?

- What performance or quality indicators are needed to describe the impact and success of such networked services?

- How might such statistics and measures be best reported?
- What linkages can be established between these statistics and performance measures with selected outcomes from higher education?

This list of research questions suggests a beginning perspective to direct project activities. These research questions may be revised as the project proceeds.

Project Approach and Management

This prospectus assumes that a group of interested ARL libraries will work together as a consortium in conjunction with a study team at the Information Management Use and Policy Institute at Florida State University http://www.ii.fsu.edu and with ARL staff. The members of this group would each agree to make a commitment of $10,000 to fund the project. The study would begin May 12, 2000 and be completed December 2001 (20 months). ARL libraries would make their contribution to ARL; the Information Management Use and Policy Institute would then enter into a contract with the Association of Research Libraries to complete the study as outlined in this prospectus.

Participants in the study may have varying levels of direct involvement in the project. Some may decide to be *active* participants in the project in which they would provide detailed descriptions of their current activities regarding the collection and use of networked statistics; participate in reviewing and commenting on project documents and reports; serving as field sites to test and refine statistics and performance measures; meet with other participants to review project activities; organize meetings and handle logistics related to those meetings; provide direct feedback and work with the study team to complete project goals; and engage in specific data collection/analysis activities related to project activities. Other study participants may decide not to participate in such activities or only in those especially appropriate to their institution.

In each participating library there would be one person who would serve as a liaison and as a single point of contact to coordinate project activities. Depending on the level of involvement by the library, this person should be prepared to contribute up to 25% of his/her time to the project with some additional assistance from others in the library from time to time.

All libraries participating in the project may appoint a representative to serve on the project's advisory committee (AC). This group will provide feedback and suggestions to the study team as needed; they will be kept informed of project activities; and they will meet from time to time (electronically and in-person) to discuss project progress and issues. The advisory committee will be co-chaired by Rush Miller and Sherrie Schmidt. Miller and Schmidt will serve as the single point of contact with the study team.

Three types of staff time will be committed to this project. First, the study team at Florida State University will commit time and effort to the project as described later in this prospectus. Second, staff from participating ARL libraries will be contributing time and effort to the project as described earlier. Third, ARL staff will commit time and effort to the study by assisting in selected data collection activities, insuring effective communications with ARL libraries, providing background information and resources, and maintaining a website to describe and update project activities.

Project Phases and Activities

Based on discussions at the ARL New Measures invitational conference held in Scottsdale, AZ February 28-29, 2000 the following project phases and activities have been developed. Note that two or more activities within a phase may occur simultaneously. The project activities related to developing statistics from database vendors are an ongoing process throughout the entire study. Upon project funding detailed scheduling and tasking will occur.

Phase I: Knowledge Inventory of ARL Libraries and organizing an ARL Working Group on Database Vendor Statistics (May, 2000 – October, 2000)

The two objectives of this phase are to (1) identify and describe the current state of the art of statistics and performance measures for networked services and resources in ARL libraries, and (2) organize an ARL Working Group on Database Vendor Statistics to begin discussions with database vendors.

Activity 1 of this phase will be to conduct an inventory that will survey all ARL libraries as to their current practices, activities, statistics, performance measures, data collection and reporting processes. After the survey has been completed, the study team will conduct site visits at those libraries that appear to have the most useful information and insights into study topics. The inventory will stress data collection, statistics, and performance measures in the following areas:

- Users of networked information services and resources, e.g., who are the users of specific types of networked services and resources?
- Uses of networked information services and resources, e.g., what are the applications and uses of these services and resources by the users?
- Staffing and training, e.g., how have networked information services and resources affected the staffing and staff training in libraries?
- Networked information services, e.g., electronic reference transactions, electronic forms submission, etc.
- Cost analysis of networked information services and resources, e.g., what are the costs per transactions of particular services such as cost per full text down-load?
- Vendor-based database information, e.g., what statistics are being compiled by which libraries from which vendors with what information and how are those data defined? NOTE that this area is an ongoing project effort that continues throughout all phases of the project.

Initially these topics will provide a first priority for inventorying the current knowledge of ARL libraries related to networked services and resources.

Due to a research award received by study team member Jeff Shim, Florida State University, he will be able to conduct site visits during the summer of 2000 to selected ARL libraries at no cost to the project.

Activity 2 initiates a process whereby an ARL Working Group on Database Vendor Statistics can begin discussions with selected vendors regarding a plan to identify, collect, and report various database statistics. Such statistics include, but are not limited to, uses of the databases, frequency of use, time of use, log-ins to particular titles, IP addresses of log-ins, turn-aways, etc.

Tasking for this phase includes the establishment of an ARL Working Group on Database Vendor Statistics: having the group define key issues and objectives; coordinate activities with ICOLC and other appropriate groups; propose possible guidelines and procedures for vendor-produced database statistics; begin meeting with selected database vendors; and develop a process to clarify needs and expectations by both the vendors and the ARL Working Group.

Products from Phase I: The product from Phase I will be an interim report that:

- Describes the knowledge and best practices currently in use by ARL libraries regarding statistics and performance measures for electronic information services and resources;
- Describes the range and types of data being obtained by ARL libraries from the various database vendors;
- Describes key issues that will need to be resolved in producing statistics and performance measures; and

- Presents a status report on the activities of the ARL Working Group on Database Vendor Statistics, its objectives, and its next steps in Stage II.

In addition, members of the study team will provide an Executive Briefing to project participants in conjunction with the Fall, 2000 ARL meeting.

Phase II: Development of statistics and performance measures (November, 2000 – June, 2001)

The objective of this stage is to develop tools, data collection processes, statistics, and performance measures to describe services and resources in the networked environment.

Activity 1 will develop an approach to take the knowledge learned from Phase I into a research methodology to develop, define, and propose possible statistics and measures. In short, the activity will produce a detailed tasking and methodology by which statistics and performance measures can be developed, tested, and refined. This activity will also propose data collection techniques and instruments for use by participating libraries to produce statistics and measures in each of the areas identified in Phase I. The process will draw heavily upon input and advice (in an iterative fashion) from participating libraries.

Activity 2 will be the field-testing of these proposed data collection techniques, statistics, and measures. The study team anticipates that four-six participating libraries will serve as field sites to test the approaches developed in phase I. A process will be developed for each library to test some portion of the proposed statistics and report on the efficacy of the process as well as the statistics and measures themselves.

Activity 3 will be the analysis of the field test results and the writing of a short manual that describes the process for data collection, the statistics, and the performance measures. The study team will determine what appears to be working well in terms of process and what needs additional work and revision. Depending on the results from the field test, some additional work and refinement on selected statistics and measures may be needed prior to writing the data collection, statistics, and measurement manual.

Activity 4 of this phase is to develop a model that integrates the statistics and measures into (1) higher education educational outcomes, research outcomes, and service outcomes, and (2) library educational outcomes, research outcomes, and service outcomes. In fact, this phase will be under development throughout the entire phase as development of statistics and measures must occur in the broader context of their purposes and their relationship with higher education outcomes. Findings from Phase I will inform the development of such models.

Activity 5 of this Stage is to continue activities of the ARL Working Group on Database Vendor Statistics. This effort is ongoing throughout Phase II. During this Phase we would expect that meetings between the ARL working group and the database vendors would be moving toward agreement on data element definitions and terms, to specific statistics and data that can be collected, and methods for reporting these data to libraries. The study team would expect to include these data collection techniques in the field test described in activity 3 above.

Products from Phase II include;

- A written methodology to develop and field test data collection techniques, statistics, and performance measures;
- A short concise written manual that describes how these statistics and measures can be produced, that will include:
  - introduction to the importance and need for statistics and performance measures that describe electronic services and resources;
  - data collection techniques and methods for each of the statistics and performance measures;
  - issues to be considered in using and interpreting these statistics and performance measures;
  - recommendations for future work in the development of new or refinement of existing statistics and performance measures; and

  - appendices of data collection instruments developed and tested during the field tests;

- A written status report on the activities and accomplishments of the ARL Working Group on Database Vendor Statistics, and issues/next steps to be addressed; and

- A one-day workshop, held in conjunction with ALA or an ARL meeting to present the manual and discuss project findings during the late spring of 2001.

Phase III: Institutionalizing Statistics and Performance Measures (July 2001-December 2001)

The objective of this phase is to develop mechanisms and processes that insure the ongoing development of networked statistics and performance measures. This objective includes building and promoting infrastructure in ARL and ARL libraries to continue the development and use of such statistics and measures.

Activity 1 of this phase is to develop a research proposal to obtain external funding to continue research and field-testing related to networked information statistics and measures. The study team will work with ARL staff and the advisory committee in the development of this proposal and the identification of appropriate funding bodies that may be interested in supporting continued work in this area. Specific research questions and initiatives in this proposal will result from findings and activities in Phase II.

Activity 2 of this phase is to develop a number of training modules and training support systems (both in print and electronically) that ARL and ARL libraries can use to assist staff understand the importance of the new statistics and measures developed as part of this project, as well as help them on a very practical level collect, analyze, and report quality data. The study team anticipates developing and testing these modules but assumes that ARL members or ARL staff would be actively engaged in the instruction.

Activity 3 of this phase is to continue refining and testing the model(s) that integrate the statistics and measures into (1) higher education educational outcomes, research outcomes, and service outcomes, and (2) library educational outcomes, research outcomes, and service outcomes. The study team anticipates developing a process to validate these models and determine the potential usefulness of the model(s) to describe impacts from networked information services and resources.

Activity 4 of this phase will continue activities of the ARL Working Group on Database Vendor Statistics. This effort is ongoing throughout Phase III. During this Phase we would expect that meetings between the ARL Working Group and the database vendors would have reached agreement on data element definitions and terms, on specific statistics and data that can be collected, and methods for reporting these data to libraries. The study team would expect to assist the ARL Working Group extend the number of database vendors agreeing to the guidelines that would have resulted for data collection and statistics.

Products from Phase III include:

- A proposal that can be submitted to potential fundors to continue research and development on statistics and performance measures in the networked environment and their potential impacts on a range of higher education outcomes;

- A revised and updated description of database statistics and performance measures. Based on the additional activities of the working group and discussions with database vendors we would expect to be able to build upon the database statistics developed in phase II and expand and refine them;

- Instructional modules that can assist ARL and ARL member institutions train staff as to the importance and process for collecting and analyzing networked statistics and performance measures; and

- A final report of guidelines and issues yet to be resolved as agreed to by ARL and participating database vendors on the collection and reporting of selected statistics and data elements from these databases.

It should be recognized that some fine-tuning of these phases and activities may occur as the project proceeds. Such fine-tuning will be done with the advice of the advisory committee.

Study Team Qualifications

Charles R. McClure will serve as the Principal Investigator for the study. Detail on his background, experience, and examples of recent projects he has completed can be found at <http://slis-two.lis.fsu.edu/~cmcclure>. Information about the Information Use Management and Policy Institute for which he serves as director can be obtained at http://www.ii.fsu.edu. He has a proven track record of managing projects successfully and has worked with public libraries in a range of areas including financial assessment, planning and evaluation of information services, information technology management, and resource sharing. Currently, with John Carlo Bertot, he is completing a study funded by the Institute for Museum and Library Services (IMLS) that will produce national statistics and performance measures to describe public library services and resources in the networked environment <http://www.albany.edu/~imlsstat/>.

John Carlo Bertot is an Associate Professor in the School of Information Science and Policy at SUNY Albany. He has worked with and Charles R. McClure successfully on a number of library studies, including the *Public Libraries and the Internet* national surveys from 1994 through 1998, and Internet project impact studies in Pennsylvania (*Evaluation of the Online at PA Libraries Project: Public Access to the Internet through Public Libraries*) and California (*The Importance of California Public Libraries in Increasing Public Access to the Internet*). Bertot and McClure have also collaborated on a number of technology planning and evaluation projects. Additional background information on Bertot's experience and skills can be found at <http://www.albany.edu/~jcbertot/>.

Jeff Shim, Assistant Professor of Information Studies at Florida State University and a Research Associate at the Information Use Management and Policy Institute will also serve on the study team. Shim recently completed his Ph.D. from Rutgers University where his primary research centered on an analysis of ARL statistics. He teaches in a range of areas related to the management of information technology. He is especially knowledgeable about academic library statistics, statistical techniques for describing services and resources, and understands information technology-based services provision.

Additionally, we expect that a number of Ph.D. students and other graduate students from the School of Information Studies at Florida State University will be working on the project as research assistants. These additional staff will be involved on the project, oftentimes with no additional cost to the project.

Budget and Financial Arrangements

The budget for this project is $199,990 and is summarized in Figure 1. Every effort has been made to keep overall costs to a minimum and use budgeted monies as effectively as possible.

Figure 1. Budget May, 2000 – December 2001

Personnel*	$143,844
1. Charles R. McClure, Principal Investigator	
2. Jeff Shim, Associate Director	
3. John Bertot, Associate Director	
4. Bruce Fraser, Project Manager	
5. Research Assistants	
* Summer (May-August) will have greater average study team time commitment than the academic year	
Benefits on Personnel	28,446
Study Team Travel to ARL Libraries and Meetings	19,000

[16 trips @$1200 per trip]	
National Workshop [at end of Phase II]	1,250
Communications [supplies, telephone, copying, etc.]	7,250
Total	$199,990

The primary expenses will be for study team personnel, travel expenses to conduct field tests and participate in various meetings, and various communications support. The study would be conducted as a fixed-price contract. One-fourth of the project costs will be paid upon formal agreement to conduct the study, with one-fourth of the project costs paid at the conclusion of each of the three stages.

Project Communications

The study team anticipates regular and ongoing communication with participating institutions as well as all ARL libraries via the ARL New Measures Project Initiative Website (on the ARL or another Website). ARL staff as well as possibly other staff from ARL participating libraries will have responsibility to mount project information, updates, project reports, issue papers, and other items on that website.

In addition, a discussion list related to the project will be operated and maintained by ARL for regular posting of information and for the exchange of ideas and views related to the project and the development of statistics and performance measures related to the networked environment. Regular meetings (either in conjunction with other professional meetings or electronically) will occur with the advisory committee to discuss project activities. The project Advisory Committee Chairs and project liaisons (Miller and Schmidt) will keep other committees at ARL apprised of project activities as needed.

Use of Project Information and Findings

The study team reserves the right to use data and findings from this project in other future studies and research efforts. Indeed, much of the insight and information that the study team brings to this effort is a result of years of previous research and related projects. In addition, McClure, Bertot, and Shim reserve the right to publish papers (hopefully in conjunction with project participants) and otherwise use information from this project for other educational and instructional purposes. Any papers submitted for publication would be provided to the liaison for review and comment prior to actual publication and would acknowledge the support of the project. Data and related findings from the project would be reported in aggregate form only and would not be linked to individual libraries.

Importance of the Project

To some extent, ARL libraries are under-representing and under-counting the range of services and resource provision in which they are engaged because there are no agreed upon means to count and describe service provision in the networked environment. In addition, resource allocation decisions are further complicated by a limited understanding of the use and costs of services provision in the networked environment. Given this situation, library administrators are oftentimes unable to demonstrate the importance and impact of such networked-based services. Such is true for individual libraries as well as for ARL libraries as a group.

Clearly, the problems and issues identified in this prospectus regarding counts and measures of services and resources in the networked environment will not disappear in the near future. Indeed, these issues are only likely to increase in importance as the networked environment evolves with a range of *new* services and resources. Support for this project provides ARL and a group of ARL libraries to take a leadership role in the process of developing statistics and measures for services and use in the networked environment. It provides a basis for ARL libraries to formally begin work with selected database vendors to reach agreement on possible data reporting activities. And…the project will begin to develop linkages between these statistics and performance measures and a range of higher education outcomes.

Most ARL libraries need such statistics and measures *now*. The sooner work is initiated on a project such as that outlined in this prospectus, the sooner such statistics and measures can be used to support resource allocation decisions, services provision and assessment, and strategic planning.

Appendix B. List of Statistics and Measures Considered

Table B.1 List of Statistics and Measures Considered

Categories	E-Metrics v1.0 (Initial List)	E-Metrics v.1.1 (Revised List)	E-Metrics v.2.0 (Field Test List)
Resources	• Number of electronic full-text journals (hosted by library) • Number of electronic full-text journals (through subscription) • Number of librarians providing electronic reference • Number of public access workstations	• Number of electronic full-text periodicals (hosted by library) • Number of electronic full-text periodicals (through institutional subscription) • Number of electronic full-text periodicals (through consortia and other arrangements) • Number of electronic reference databases (through institutional subscription) • Number of electronic reference databases (through consortia and other arrangements) • Number of electronic books • Number of staff providing electronic reference • Number of public access workstations	• Number of electronic full-text journals (institutional) • Number of electronic full-text journals (consortia) • Number of electronic reference sources (institutional) • Number of electronic reference sources (consortia) • Number of electronic books (institutional) • Number of electronic books (consortia)
Use	• Logins (sessions) • Queries (searches) • Turn-aways (requests exceed simultaneous user limit) • Items examined (viewed, downloaded, emailed, printed) • Total user connection time to vendor databases • Virtual visits to networked library resources • Electronic reference transactions • Number of people participated in user instruction on electronic resources	• Number of logins (sessions) to networked library resources • Electronic reference transactions • Number of Logins (sessions) to electronic databases • Queries (searches) • Total connection time to electronic databases • Items examined (viewed, downloaded, emailed, printed) to electronic databases • Turn-aways (requests exceed simultaneous user limit) • Number of people participated in user instruction on electronic resources and services	• Number of electronic reference transactions • Number of logins (sessions) to electronic databases • Number of queries (searches) in electronic databases • Items examined in electronic databases
Cost	• Cost of electronic database subscriptions • Cost per items examined (subscribed databases)	• Cost of electronic files (one-time/monographic purchase) • Cost of electronic full-text periodicals subscriptions • Cost of electronic reference databases subscription • Library contribution to consortia for electronic databases	• Cost of electronic full-text journals • Cost of electronic reference sources • Cost of electronic books • Library expenditures for bib. utilities, networks, and consortia • External expenditures for bib. utilities, networks, and consortia
Local Digital Collection	• Cost of internal digital collection construction	• Cost of internal digital collection construction	• Size of library digital collection • Use of library digital collection • Cost of digital collection construction and management

BEST COPY AVAILABLE

Categories	E-Metrics v1.0 (Initial List)	E-Metrics v.1.1 (Revised List)	E-Metrics v.2.0 (Field Test List)
Performance Measures	• Percentage of electronic reference transactions of total reference • Percentage of electronic materials use of total library materials use • Percentage of remote library visits of all library visits • Ratio of public access workstations to university population (number of faculty, staff, and students)	• Percentage of of electronic reference transactions of total reference • Percentage of of electronic materials use of total library materials use • Percentage of of remote library visits of all library visits • Percentage of of electronic titles to all periodicals • Percentage of of electronic books to all monographs • Ratio of public access workstations to university population • Cost per items examined in individually subscribed databases	• Percentage of of electronic reference transactions of total reference • Percentage of of electronic materials use of total library materials use • Percentage of of remote library visits of all library visits • Percentage of of electronic books to all monographs

Appendix C. Forms

Figure C.1 (for C1-C3)

SAMPLE ELECTRONIC RESOURCE COST REPORT FORM

Reporting Period: ______________________

Name of library: ______________________

Resource/ Consortium Name and Type Full-text journals (1) Reference sources (2) Electronic books (3)	Cost	Comments
Sub Total (1)		
Sub Total (2)		
Sub Total (3)		
Grand Total (1+2+3)		

Figure C.2 (for C4)

SAMPLE CONSORTIA EXPENDITURE REPORT FORM

Reporting Period: ________________________

Name of library:________________________

Consortium Name	Amount	Comments

Figure C.3 (for C5)

SAMPLE CONSORTIA FUNDING REPORT FORM

Reporting Period: ____________________

Name of library: ____________________

Consortium Name	Total Funding Amount	Amount Attributable to the Library	Comments

Figure C.4 (for D1)

SAMPLE LIBRARY DIGITAL COLLECTION INVENTORY REPORT FORM

Reporting period: ________________

Name of library: ________________

ETDs		Visual Materials		Texts		Audio/Video/Multimedia		Total	
Titles (1)		Items (2)		Titles (3)		Titles (4)		Titles (1+2+3+4)	
								Size (GB)	

Figure C.5 (for D1)

SAMPLE DIGITAL COLLECTION ITEMS ADDED REPORT FORM

Reporting period: ________________

Name of library: ________________

ETDs		Visual Materials		Texts		Audio/Video/Multimedia		Total	
Titles (1)		Items (2)		Titles (3)		Titles (4)		Titles (1+2+3+4)	
								Size (GB)	

Figure C.6 (for D1)

SAMPLE LIBRARY DIGITAL COLLECTION REPORT FORM

Reporting Period: ____________________

Name of library: __________________

Project Name	Information Type 1. ETD 2. Visual Materials 3. Texts 4. Audio/Video/Multimedia	Server Name	Directory Location	No. of Titles	Size (GB)

Figure C.7 (for D2)

SAMPLE DIGITAL COLLECTION ACCESS REPORT FORM

Reporting Period ____________________

Name of library: ____________________

Project Name	Server Name	Directory Location	Title Access Count	Item Access Count	Total Searches	Comments

Figure C.8 (for D3)

SAMPLE DIGITAL COLLECTION COST REPORT FORM --Personnel

Reporting Period ____________________

Name of library: ____________________

Name	Position	{Annual Salary}	FTE	{Staff Cost}

Figure C.9 (for D3)

SAMPLE DIGITAL COLLECTION COST REPORT FORM

Reporting Period ____________________

Name of library: ____________________

Project Name	Expense Type	Amount
Project (name) Total		
Project (name) Total		
Library Total		

Information Use Management and Policy Institute

November 20, 2001

Dear E-Metrics Project Participants:

The attached tables summarize information regarding usage statistics of electronic content services provided to the E-Metrics project team as part of the vendor statistics field testing during May and June 2001. The information was provided voluntarily by the database vendors as listed in the tables to aid understanding of usage statistics being provided by these vendors.

The tables should provide a context in which future discussions to improve usage statistics can take place. Please note that usage statistics from vendors change constantly and information herein may not reflect current practices.

Please contact Jeff Shim (wshim@lis.fsu.edu) if you have any questions regarding the contents of the tables.

Wonsik "Jeff" Shim
Assistant Professor
Information Use Management and Policy Institute
Florida State University

School of Information Studies
Florida State University
Information Institute
http://www.ii.fsu.edu

Table 1. Searches

Vendor	Category	Information
Academic Press (IDEAL)	Definition	"Not Provided"
	Additional Information	"Not Provided"
Bell & Howell	Definition	Search count is incremented every time the search button is clicked.
	Additional Information	• The information provided is the total number of searches in each search mode broken out by database, location, and userid. • Subsequently clicking next to retrieve the next set of results does not increment the search count • Subsequently browsing of issues of a journal and/or documents within the journal does not increment the search count • Searching and navigating within the topic tree does not increment the search count.
EBSCO	Definition	Search can be counted: • for each search of an EBSCO host database • once for each database when a single search is applied to multiple databases • for each persistent link followed (a search by accession number is performed) • for each database search conducted by browsing authority files such as subjects, journals, authors, etc • when a subject link/an author/a table of contents are clicked on the full display of an article. (The link is the volume/issue enumeration)
	Additional Information	• The total search count accumulated for customers • Searches against multiple databases will increment for each database • Searches repeated will count each time they are performed
Elsevier (Science Direct)	Definition	• Searches can be performed using the basic and advanced modes. [Search activity] report shows the usage of each of these two search modes and the total number of searches submitted.
	Additional Information	• At ScienceDirect a searchform with operators and terms used is not sent to the server but to special high speed databases. Databases subsequently send search results to the server. • Searches can be counted successful and intentional end-user requests after filtering.
Gale Group	Definition	A search is counted for each search form submitted or search link selected in any database

Vendor	Category	Information
	Additional Information	• An InfoMark search is counted each time it is executed. • If the search engine needs to perform additional searches or re-execute a search, then additional searches are counted (such as when a user reuses a search result from an expired session). • Search counts are higher on our InfoTrac Web usage reports due to the fact that we "replay" searches." Replays" are re-executed searches, (and search counts increase accordingly). Cases when searches are replayed are: 1) A user switches databases and goes back to a search in a previous database For example, if a user goes through these steps: 1. User is in Database A and performs a search. 2. User opens Database B (A is closed, B is opened). 3. User goes back and clicks on a Database A search (B is closed, A is opened, search is replayed.) So, A is re-opened and enough done to get the user to the point desired (replaying the search to get the citation list). Not everything that the user previously performed is replayed. (Nested searches are replayed in sequence. Ex: search, read article, click on doc link search.) 2) Upon restarts of after a session time-out. After 6 minutes of user inactivity, the user interface (UI) calls the back-end server (ITS) to close down the associated session. If later, the user continues then a new backend ITS session is started. If the user clicks on a previous search, then a search is executed (in essence replayed and recounted). A UI session can be timed-out and if restarted, can replay and recount a search. The time-out time has been chosen in consideration of simultaneous users wanting to get on. Another case where it replays and recounts a search. 1. User performs a search and gets back a citation list. 2. User looks at an article from that list. 3. User clicks on a document link which returns a citation list. 4. User goes back and clicks on the first citation list, in A. (This action will replay the search to get the citation list.)
Lexis-Nexis	Definition	• Searches submitted refers to the number of times the specific search form URL was accessed and the search button was clicked on.
	Additional Information	• Assume that access of specific URL equals document retrieval/search.
netLibrary	Definition	A patron performed a search across the eBook collection by filling in a web form and clicking a search button on either the Quick Search field present on most netLibrary web pages, the Power Search form or the Command Search form.
	Additional Information	• This statistics reports the number of searches performed. • All searches are reported: keyword searches and full text searches. • Statistics are reported as a summary and by time of day, day of week.

Vendor	Category	Information
OCLC (FirstSearch)	Definition	FirstSearch counts a search for each of the activities listed below. ▪ A search in multiple databases is counted in each database. Ex) if 3 databases are included in a search, 3 searches are counted. ▪ Searching for a word or phrase using a search screen, previous searches screen, or other screen on which searches can be entered. ▪ Redoing a search with added words, phrases, or search limits. ▪ Clicking a link that returns search results. Ex) clicking a subject or author link in a record or Expand Search screen, clicking a link in a Limit Results screen, or clicking a subject heading link in a Preferred Subject Headings screen. ▪ Clicking the results link for a previous search or combining two or more previous searches. ▪ Viewing or e-mailing a full-text document when using the per-search method to purchase full text. Each document viewed or e-mailed counts as five searches. If you view and e-mail the same document, it is counted once as five searches. Ex) The following are WorldCat database search examples. • First example (3 to 5 searches counted): - Search for fetal alcohol syndrome (one search). - Redo the search adding the term, and education (a second search). - Redo the search using limits (1980 to the present, English-language, and books). If you set each limit separately and redo the previous search each time, FirstSearch counts three additional searches. If you set all the limits before redoing the search, FirstSearch counts only one additional search. • Second example (1 search counted): - Set the limits used in the first example and search for fetal alcohol syndrome and education to retrieve the same final results as the first example.

Vendor	Category	Information
	Additional Information	No search is counted if your search finds no records and at least one word or phrase in the search appears in no records. For example, the following search is not counted. You misspell umpires and enter the search baseball and umpires in WorldCat. Because umpires appears in no records, no records are found and no search is counted. A search is counted if it finds one or more records. A search is also counted if it finds no records but each word or phrase in the search appears in one or more records. For example, the following search is counted although it finds no records. You enter the search baseball and radishes in WorldCat. No records are found because no record contains both baseball and radishes. However, a search is counted because baseball appears in one or more records and radishes appears in one or more other records. What is not counted. FirstSearch activities, such as those listed below, are not counted as searches: - Selecting a database - Asking FirstSearch to suggest a database - Viewing, printing, e-mailing, or downloading records (Viewing or e-mailing full-text documents counts as 5 searches for per-search accounts.) - Sorting search results - Ordering documents through interlibrary loan - Using help or searching within help - Finding libraries that own an item - Looking up words in a Browse Index (before clicking on a link to begin a search) - Finding a preferred subject heading or expanding a subject term - Using the Expand or Limit feature available with lists of records (before clicking on a link in those features to begin a search)
Silver-Platter	Definition	The number of queries sent to the specified database during the selected time period
	Additional Information	"Not Provided"

Table 2. Session

Vendor	Category	Information
Academic Press (IDEAL)	Definition	"Not Provided"
	Additional Information	"Not Provided"
Bell & Howell	Definition	"Not Provided"
	Additional Information	"Not Provided"
EBSCO	Definition	A session is counted each time a use logs in.
	Additional Information	The session will remain active for 10 minutes beyond the last activity by the user. If the user returns it the workstation after longer than a 10- minute delay, the user will be reconnected and the session continues uninterrupted. The session count will increment on each such reconnect.
Elsevier (Science Direct)	Definition	Sessions are defined as a series of consecutive actions if one IP or one user.
	Additional Information	• A session starts at the moment of a first request of a user and ends after 30 minutes of no activity. • Average session duration is the time of the average session-length of all users of a customer per month. • A user is defined as a distinct IP-number or as a Registered User (registering with Username and Password). • (N.B.: in the web-environment it is impossible to monitor whether a user has left a site. To be able to denote when a session ended the (artificial) 30-minute no-activity threshold is used to define the session-end of a user).
Gale Group	Definition	A session is counted for a particular database each time a user enters that database within an overall session (which began when they first logged in to the service). For example, if a user leaves one database goes into another and then re-enters the original database again during that same overall session the session count for the original database would be two.
	Additional Information	After 6 minutes of user inactivity, the user interface (UI) calls the back-end server (ITS) close down the associated session.
Lexis-Nexis	Definition	"Not Provided"
	Additional Information	"Not Provided"
Net Library	Definition	A user session is defined as a cluster of web site usage (time based) of any eBook-related web page on the Net Library web site by an individual. EBook-related web pages include search, bibliographic summary display, checkout, eBook viewing, login, logout and bookshelf activity.
	Additional Information	A user session cluster is considered terminated after 30 minutes of inactivity
Silver Platter	Definition	The number of times the username(s) logged into the database (for example: MEDLINE Advanced) during the selected time period.
	Additional Information	"Not Provided"

Table3. Items Requested

Vendor	Category	Information
Academic Press (IDEAL)	Definition	"Not Provided"
	Reported Statistics	Full text, reference, abstract, table contents, PDF
Bell & Howell	Definition	"Not Provided"
	Reported Statistics	Abstracts, citations, text only, text+graphics, page image
EBSCO	Definition	"Not Provided"
	Reported Statistics	Full text, reference, abstract, table contents, PDF, citation, e-mail, Fax, Text+Graphics, page image, hits, summary section Full text- this statistic increments for the following actions: • The full display (abstract view) of a search result is retrieved and there is full text (full text is retrieved automatically) Includes links from result list or next/previous records from full display where full text is displayed. * • A full text link is followed from the result list • The ASCII full text is printed, saved or emailed using the print/email function. ** • A persistent Link to full text is followed. *If the user displays the same record multiple times, each view is counted. **If the user views a record then prints it, the statistics are incremented for both actions. PDFs- this statistic increments each time an EBSCOhost PDF is: • Viewed using regular EBSCOhost session* • Viewed using persistent links • Viewed using SmartLinks. Note that this counts only EBSCOhost PDFs and will not count SmartLinks to e Journals managed through EBSCO online * If the user displays the same PDF multiple times, each time the statistic is incremented Abstracts-This statistic increments for the following actions: •The full display (abstract view) of a search result is retrieved (includes links from result list or next/previous records from full display) •A full text link is followed from the result list •A citation is printed, saved or emailed using the print/email function** •The ASCII full text is printed, saved or emailed using the print/email function (abstract is retrieved to include with the full text display) •A persistent link to and article detail full text is followed. *If the user displays the same record multiple times, each view is counted.
Elsevier (Science Direct)	Definition	"Not Provided"
	Reported Statistics	Full text articles were provided in PDF, HTML, PS and article summary format (header, abstract, images and the list of reference) e-mail, table of contents, citation. •A proper filtering should remove: All log records generated when a page requests the embedded image files and objects (.GIF, .JPG, .JPEG, frames) and all log records containing a return code other than "200"(successful request), or "301"(redirect) or "304"(caching) are filtered. • articles can be accessed as a result of a search or through browsing (e.g. from table of Contents to Article)

Vendor	Category	Information
Gale Group	Definition	• Retrievals – Reteievals are counted for each article printed from an attached printer or emailed through the service. Browser prints are not counted. The Journal retrievals ststistics counts articles printed from an attached printer, emailed through the system, downloaded in PDF or postscript format, and articles printed through the PrintStation in the "Total" retrievals column. The journal retrievals ststistics has a separate column for articles printed through the PrintStation. An article is counted once persession regardless of times it was retrieved. Note that for GaleNet products, all retrievals are counted as "Views" even if the article was formatted for printing or emailed. • Views- Views are on-screen displays of articles from within a particular database. These are counted when the user enters a citation (clicks on that citation in a search results list) to view the article. An article is counted only once per session regardless of the number of times it was viewed. Note that for GaleNet products, all retrievals are counted as" Views" even if the article was formatted for printing or e-mailed.
	Reported Statistics	Full text, abstract, PDF, citation, e-mail, Fax, post script format, print station, hits
Lexis-Nexis	Definition	•Documents Retrievals refers to the number of document list pages that are retrieved for a specific search form. • Assume that access of specific URL equals document retrieval/search. • It is suggested that documents actually opened be measured.
	Reported Statistics	Full text, document retrievals
netLibrary	Definition	Pageview - A patron viewed a page of an eBook online, using a web browser. Freepageview - A patron viewed a page of a public, free eBook online, using a web browser. Checkout - A patron explicitly checked out an eBook, reserving it for exclusive use for a defined period of time. Browse - A patron implicitly checked out an eBook by opening and viewing it via a web browser, by clicking on the link "Browse this eBook online" on the bibliographic summary page for the eBook.
	Reported Statistics	Pageview, Freepageview, Checkout, Browse
Silver Platter	Definition	• Abstract viewed - The number of abstracts requested for display by the retrieval software (WebSPIRS, WinSPIRS or MacSPIRS). This field does not necessarily indicate the number of records read by end user. • Records viewed - The number of abstracts requested for display by the retrieval software (WebSPIRS, WinSPIRS or MacSPIRS). This field does not necessarily indicate the number of records read by end user.
	Reported Statistics	Abstract, Full text

Table4. Turnaways

Vendor	Category	Information
Academic Press (IDEAL)	Definition	"Not Applicable"
	Additional Information	"Not Applicable"
Bell & Howell	Definition	"Not Applicable"
	Additional Information	To access this system, users must have a valid username and password
EBSCO	Definition	"Not Applicable"
	Additional Information	Databases under this study do not fall under any kind of simultaneous use restrictions
Elsevier (Science Direct)	Definition	"Not Applicable"
	Additional Information	"Not Applicable"
Gale Group	Definition	Counted for each failed entry into a database due to enforcement of simultaneous user limits.
	Additional Information	To access this system, users must have a valid username and password
Lexis-Nexis	Definition	"Not Applicable"
	Additional Information	"Not Applicable"
NetLibrary	Definition	A patron was unable to view an eBook for one of the following reasons. • The library or consortium doesn't own a copy The library won at least one copy but all copies were in use • The library doesn't own a copy and the consortium owns a copy but all copies were in use • The patron had reached the checkout limit, expressed in number of eBooks to be checked out to an individual, as dictated by the library
	Additional Information	• Statistics are reported by title.
Silver Platter	Definition	The number of time a user was denied access based on the allowed number of simultaneous users to the specified database during the selected time period
	Additional Information	"Not Applicable"

Association of Research Libraries
Washington, D.C.
2002

Measures for Electronic Resources (E-Metrics)

Part 3

The ARL E-Metrics Instructional Module

This instructional module is one product from the ARL E-Metrics project. Combined with the *Data Collection Manual for Academic and Research Library Network Statistics and Performance Measures*, the module is intended to assist ARL member institutions with training staff about the importance of assessing network services and the process of collecting and analyzing networked statistics and performance measures. Information about the E-Metrics project and access to various project reports can be found at: http://www.arl.org/stats/newmeas/emetrics/index.html.

The module consists of the following three Microsoft PowerPoint™ presentations and accompanying notes:

- **Part 1 (Importance)** is designed to highlight the importance of network measures and statistics to research libraries. The module discusses the move to the networked model of information sources and services at research libraries and summarizes why libraries need data and statistics regarding networked information resources and services. It also contains an overview of various initiatives focusing on developing network measures.
- **Part 2 (Preparation)** outlines specific plans and methodologies to prepare and implement a process for collecting, managing, analyzing, reporting and using the network statistics and measures. It contains several examples of data analysis and reporting.
- **Part 3 (Statistics)** describes the recommended statistics and measures for networked library services contained in the ARL E-Metrics Phase II Report. For each statistic or measure, it provides a concise definition, intended use and other information related to collecting the data.

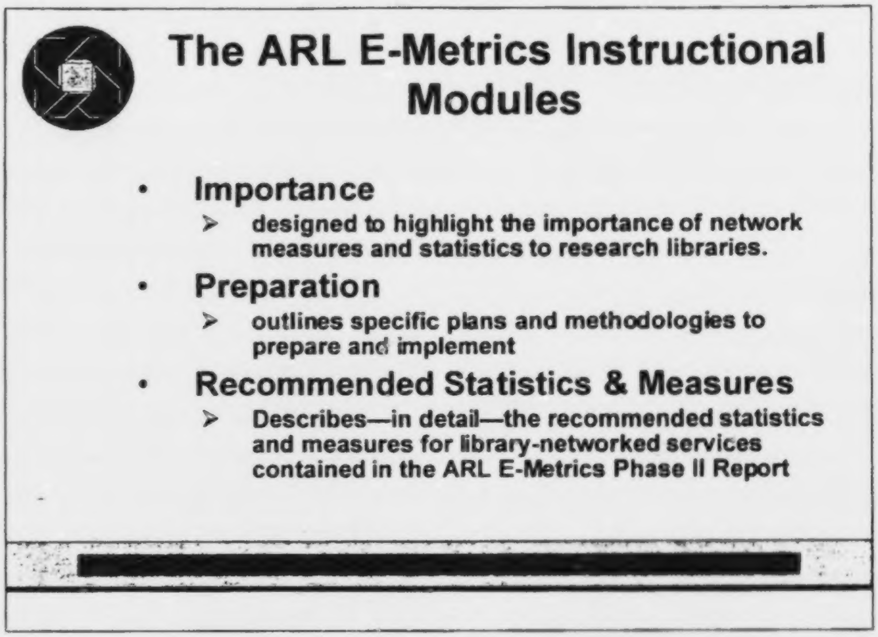
While the instructional module was developed primarily for training purposes, libraries can use the materials for discussion and review as they plan the measurement and evaluation of networked services.

The module was constructed with a broad audience in mind. Some libraries might want to use all three presentations while others might benefit from only portions of them. Libraries should use the contents to best suit their own needs. If you make changes and would like to share your modifications, please send the modified presentations to Martha Kyrillidou at ARL martha@arl.org so that they may become available to other libraries.

Libraries can choose from a wide range of options in terms of using these materials: from a one-day 6 to 7 hour immersion format, to half-day workshops or to a series of 1- to 2- hour presentations/discussions over a longer period of time. Collecting, organizing and analyzing network information deserves careful attention. We hope that this instructional module will encourage library staff to discuss the issues and the processes associated with measurements of library networked services, and that it will contribute to using the network statistics and measures effectively.

Network resources and services are changing rapidly and reshaping the services of research libraries. As such, the materials presented in the instructional module will need to be continually updated and refined. We believe the instructional module and the manual can provide that guidance and help library staff take action.

Finally, Amos Lakos of University of Waterloo Library developed the presentations together with the E-Metrics study team (Jeff Shim, Charles R. McClure, Bruce T. Fraser, and John Carlo Bertot). We also want to thank Beth McNeil (University of Nebraska-Lincoln), Christian Boissonnas (Cornell University), and Deborah D. Blecic (University of Illinois at Chicago) for their helpful comments and suggestions on earlier versions of the module.



The ARL E-Metrics Instructional Modules

- Importance
  - **designed to highlight the importance of network measures and statistics to research libraries.**
- Preparation
  - **outlines specific plans and methodologies to prepare and implement**
- Recommended Statistics & Measures
  - **Describes—in detail—the recommended statistics and measures for library-networked services contained in the ARL E-Metrics Phase II Report**

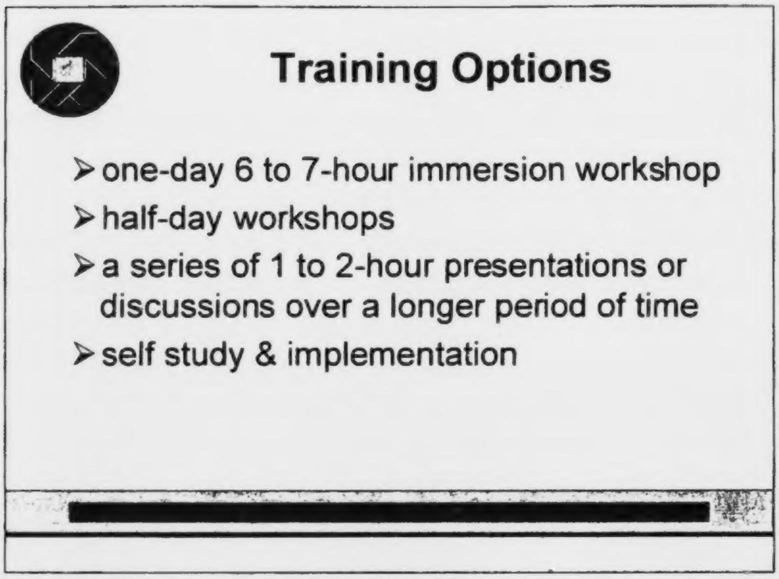
This instructional module is one product from the ARL E-Metrics project and, combined with *Data Collection Manual for Academic and Research Library Network Statistics and Performance Measures*, is intended to assist ARL member institutions to train staff about the importance of assessing network services and the process of collecting and analyzing networked statistics and performance measures. Information about the E-Metrics project and access to various project reports can be found at: http://www.arl.org/stats/newmeas/emetrics/index.html.

The module consists of the following three Microsoft PowerPoint™ presentations and accompanying notes.

§ **Part 1 (Importance)** is designed to highlight the importance of network measures and statistics to research libraries. The module discusses the move to the networked model of information sources and services at research libraries and summaries the reasons why libraries need data and statistics regarding networked information resources and services. It also contains an overview of various initiatives focusing on developing network measures.

§ **Part 2 (Preparation)** outlines specific plans and methodologies to prepare and implement a process for collecting, managing, analyzing, reporting, and using the network statistics and measures. It contains several examples of data analysis and reporting.

§ **Part 3 (Statistics)** describes the recommended statistics and measures for library networked services contained in the ARL E-Metrics Phase II Report. For each statistic or measure, it provides a concise definition, intended use, and other information related to collecting the data.



Training Options

- ➢ one-day 6 to 7-hour immersion workshop
- ➢ half-day workshops
- ➢ a series of 1 to 2-hour presentations or discussions over a longer period of time
- ➢ self study & implementation

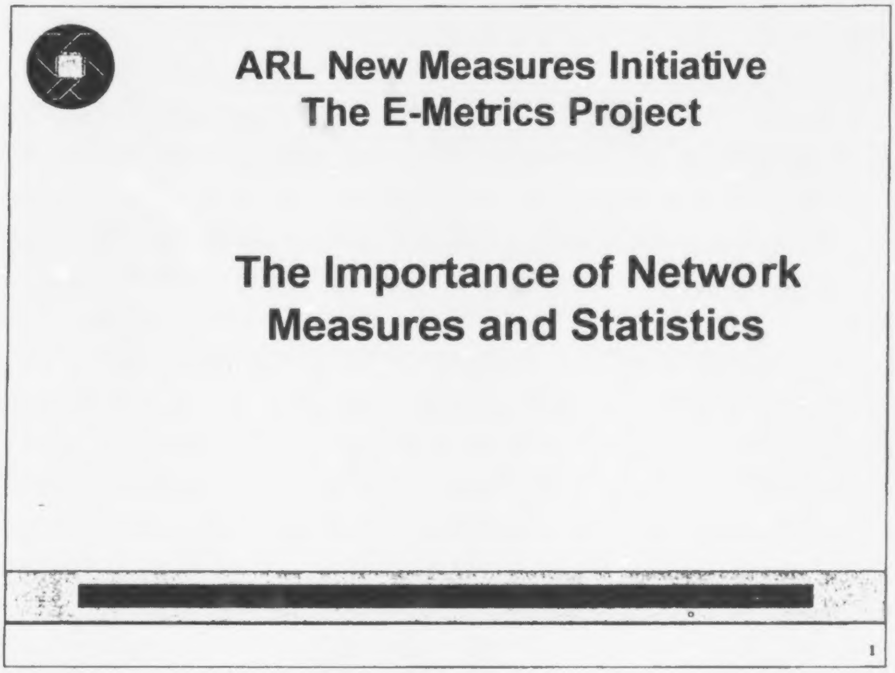
While the instructional module was developed primarily for training purposes, libraries can use the materials for discussion and review as they plan the measurement and evaluation of networked services.

The module was constructed with a broad audience in mind. Some libraries might want to use all three presentations while other libraries might benefit from only portions of them. Libraries should use the contents to best suit their own needs. If you make changes and would like to share your modifications, please send the modified presentations to Martha Kyrillidou at ARL martha@arl.org so that they may become available to other libraries.

Libraries can choose from a wide range of options in terms of using these materials: from a one-day 6 to 7-hour immersion format, to half-day workshops or to a series of 1 to 2-hour presentations/discussions over a longer period of time. Collecting, organizing, and analyzing network information deserves careful development and having library staff discuss the issues and process will contribute to using the statistics and measures effectively.

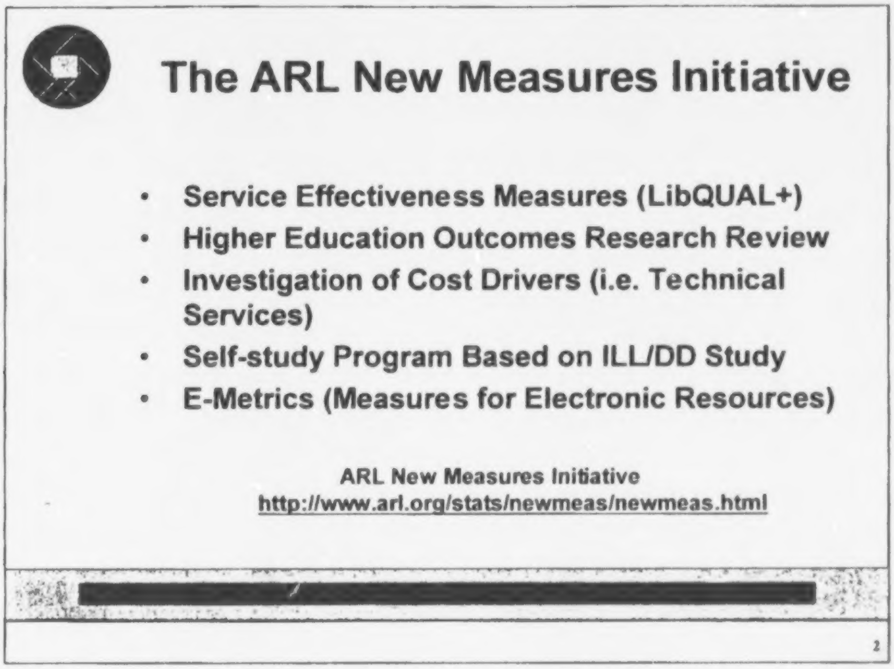
Network resources and services are changing rapidly and reshaping the services of research libraries. As such, the materials presented in the instructional module will need to be continually updated and refined. We believe the instructional module and the manual can provide that guidance and help library staff take action.

Finally, Amos Lakos of University of Waterloo Library developed the presentations together with the E-Metrics study team (Jeff Shim, Charles R. McClure, Bruce T. Fraser, and John Carlo Bertot). We also want to thank three reviewers from the participating libraries for their helpful comments and suggestions on earlier versions of the module.



ARL New Measures Initiative
The E-Metrics Project

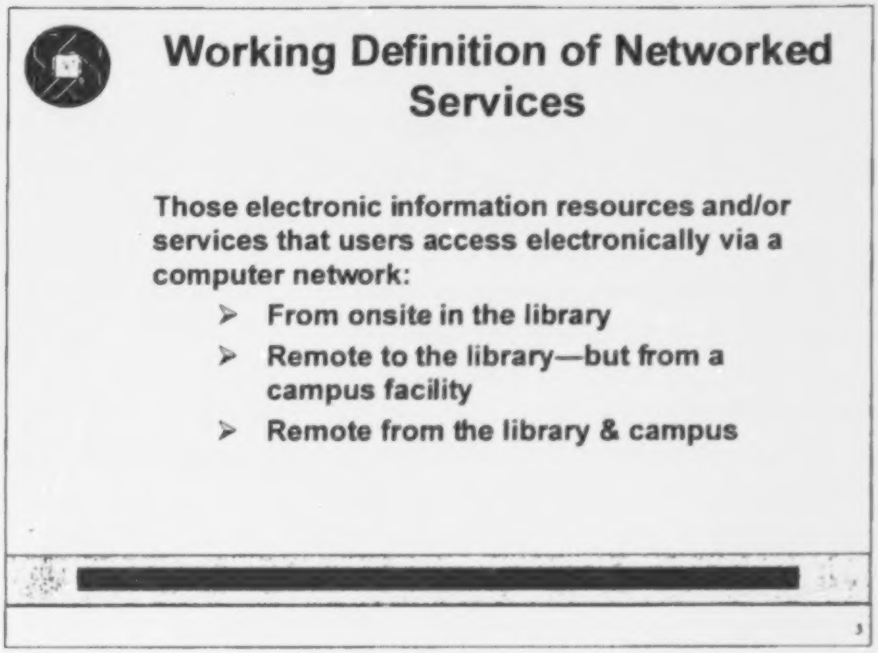
The Importance of Network Measures and Statistics



The ARL New Measures Initiative

- Service Effectiveness Measures (LibQUAL+)
- Higher Education Outcomes Research Review
- Investigation of Cost Drivers (i.e. Technical Services)
- Self-study Program Based on ILL/DD Study
- E-Metrics (Measures for Electronic Resources)

ARL New Measures Initiative
http://www.arl.org/stats/newmeas/newmeas.html



Working Definition of Networked Services

Those electronic information resources and/or services that users access electronically via a computer network:

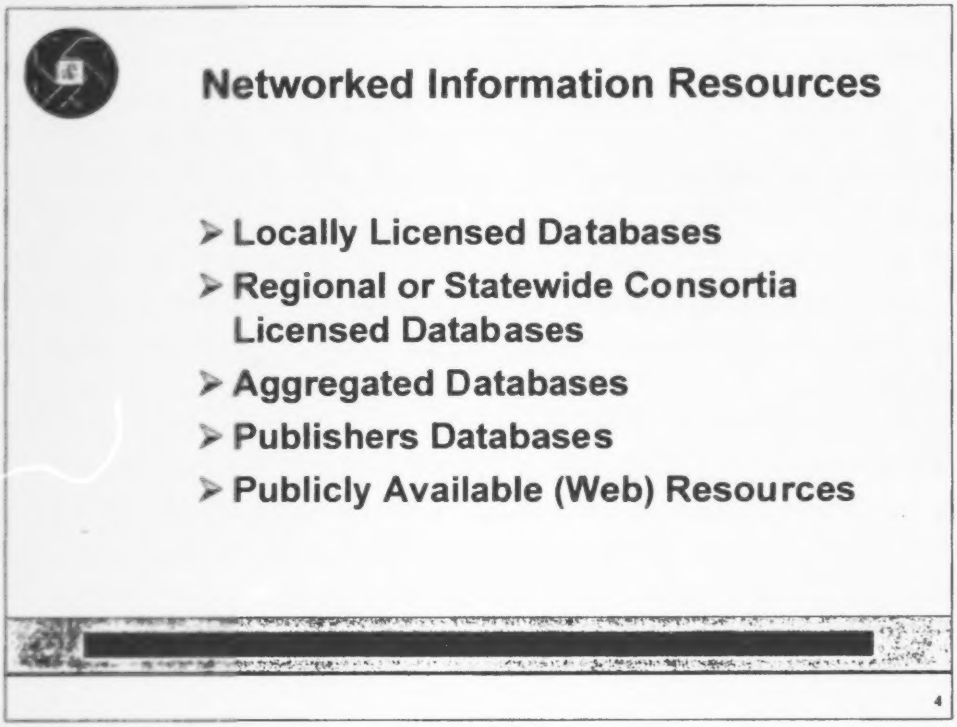
- **From onsite in the library**
- **Remote to the library—but from a campus facility**
- **Remote from the library & campus**

The working definition of networked services is *those electronic information resources and/or services that users access electronically via a computing network (1) from onsite in the library (2) remote to the library, but from a campus facility, or (3) remote from the library and campus.* Examples of networked resources include local, regional, and statewide library hosted or authored Web sites and library-licensed databases (e.g., InfoTrac, EBSCOHost, JSTOR, Project Muse).

Examples of networked services include:

- Text and numerical databases, electronic journals and books;
- Email, listservs, online reference/assistance;
- Training in the use of these resources and services;
- Request for services via online forms (i.e., interlibrary loans).

The range and types of services accessible through and supported by networks will continue to evolve as network technology changes. While there is excitement with all the developments related to the provision of networked services, there are a number of challenges that require resolution in the area of statistics and measures for networked services.



Networked Information Resources

- Locally Licensed Databases
- Regional or Statewide Consortia Licensed Databases
- Aggregated Databases
- Publishers Databases
- Publicly Available (Web) Resources

Locally Licensed Databases

These are databases that are licensed to be used by the users of the local institution only. Usually, access is provided to a local IP range.

Regional or Statewide Consortia Licensed Databases

Databases that are licensed through a consortia arrangement. The consortia may be based on libraries located by region, type of lbrary, or by librariaes that are part of a state or province. It may also be a consortia made up of libraries belonging to some organization (Cal State, etc.)

Aggregated Databases

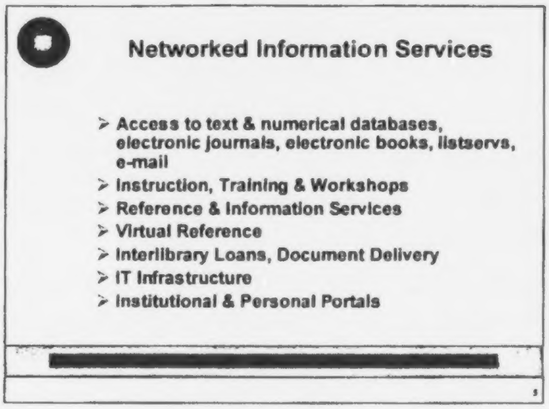
Resources available from a aggregator service (ProQuest – ABI Inform)—which puts together access to electronic resources from a variety of publishers. Access to the resources is through a common search interface, with additional services added. Costs vary.

Publishers Databases

Resources available or restricted to one publisher. Each publisher will have its own interface and various types of delivery formats, etc.

Publicly Available (Web) Resources

These are resources available freely (mostly) from the Internet. No need for particular lease agreement.



Networked Information Services

- Access to text & numerical databases, electronic journals, electronic books, listservs, e-mail
- Instruction, Training & Workshops
- Reference & Information Services
- Virtual Reference
- Interlibrary Loans, Document Delivery
- IT Infrastructure
- Institutional & Personal Portals

Access to text & numerical databases, electronic journals, electronic books, listservs, e-mail

Clients have access to all the resources made available through the library's electronic gateway. The institution provides access to most electronic resources and services to all registered clients through some type of authentifications and authorization process. Usually the service provided is free to members – eg., the service is subsidized.

Instruction, Training & Workshops

Educational services, be they instructional, training, or workshops, given to registered users in the use of the available electronic resources. These may be general in nature, or related to the use of particular resources or tools.

Reference & Information Services

Information services—restricted to authorized clients or to the general walk-in public—in support of information needs. These may be basic reference services, personalized consultative services, telephone reference, e-mail, etc.

Virtual Reference

New type of reference service available through the Web—remotely in real time—usually available anytime-anyplace-24/7 service. These services are evolving and libraries are investigating new modes and techniques in order to enhance the potential growing demand for these services.

Interlibrary Loans, Document Delivery

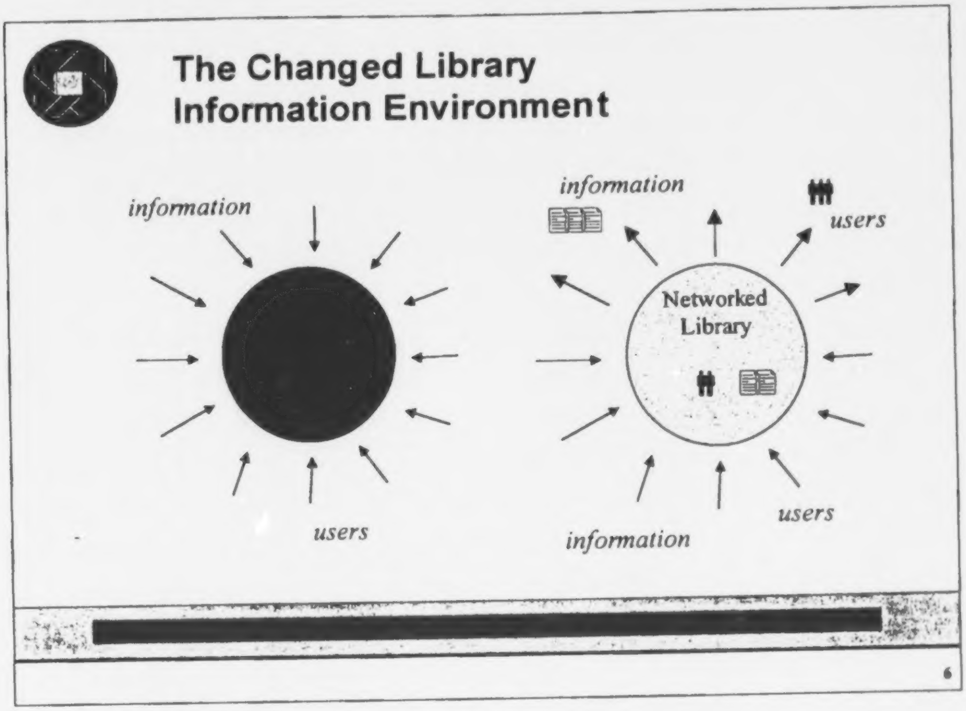
A resource sharing system is of particular importance in order to round out the services that are not available locally or through local or regional services and resources. Consortia sharing arrangement have to be developed and extended through regional, state and international systems and agreements that work.

IT Infrastructure

IT infrastructures that are effective and reliable are of particular sensitivity. If the IT systems are not well set up and they do not deliver, the whole expenditure on good resources will not be as effective to the client. IT infrastructure has to be designed, maintained, and upgraded from the client point of view— this is especially a service quality issue.

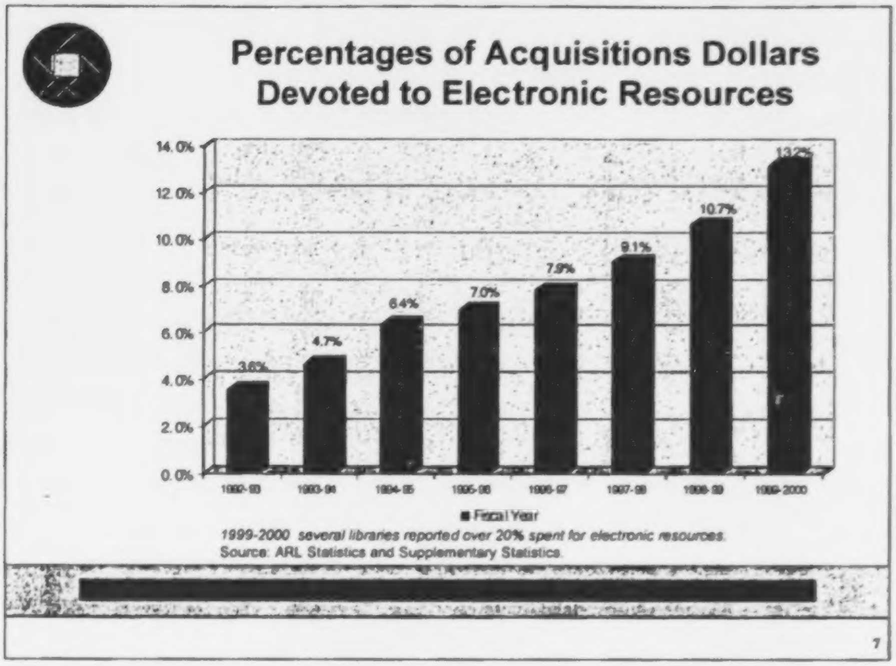
Institutional & Personal Portals

Portals are the most transformational environment for effective delivery and use of electronic resources. They are of strategic importance. Libraries can channel information where it is needed (customization) as well as allowing the end user to personalize their information search and use environment. Portals have to be built as part of an enterprise and total knowledge environment. They need to be planned and delivered with the customer in mind—deliver user-side simplicity based on complicated, difficult back-end. Portals will also change the way libraries and librarians work in the very near future.



The Changed Library Information Environment

information
users
information
users
Networked Library
users
information

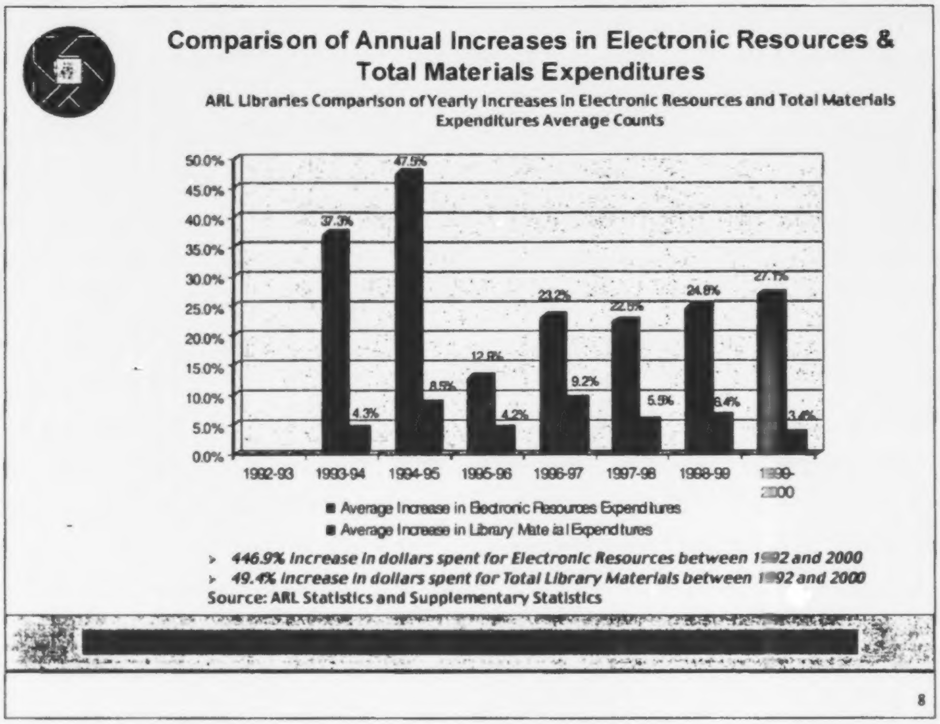


Percentages of Acquisitions Dollars Devoted to Electronic Resources

1999-2000 several libraries reported over 20% spent for electronic resources.
Source: ARL Statistics and Supplementary Statistics.

Average ARL library acquisitions expenditures for electronic resources from 1992/93 to 1999/2000. Rising from 3.6% (US$172,532) in 1992/93 to 13.2% (US$943,541) in 1999/2000.

Several libraries are spending over 20% of their acquisition $ on electronic resources and this shift from print resources to electronic resources will increase, as more resources are being digitized, archived, and new cost models become more attractive. This also means that expenditures on IT infrastructure will continue to increase and staffing to service these changing service patterns become more clear.



Comparison of Annual Increases in Electronic Resources & Total Materials Expenditures

ARL Libraries Comparison of Yearly Increases in Electronic Resources and Total Materials Expenditures Average Counts

- ***446.9% increase in dollars spent for Electronic Resources between 1992 and 2000***
- ***49.4% increase in dollars spent for Total Library Materials between 1992 and 2000***

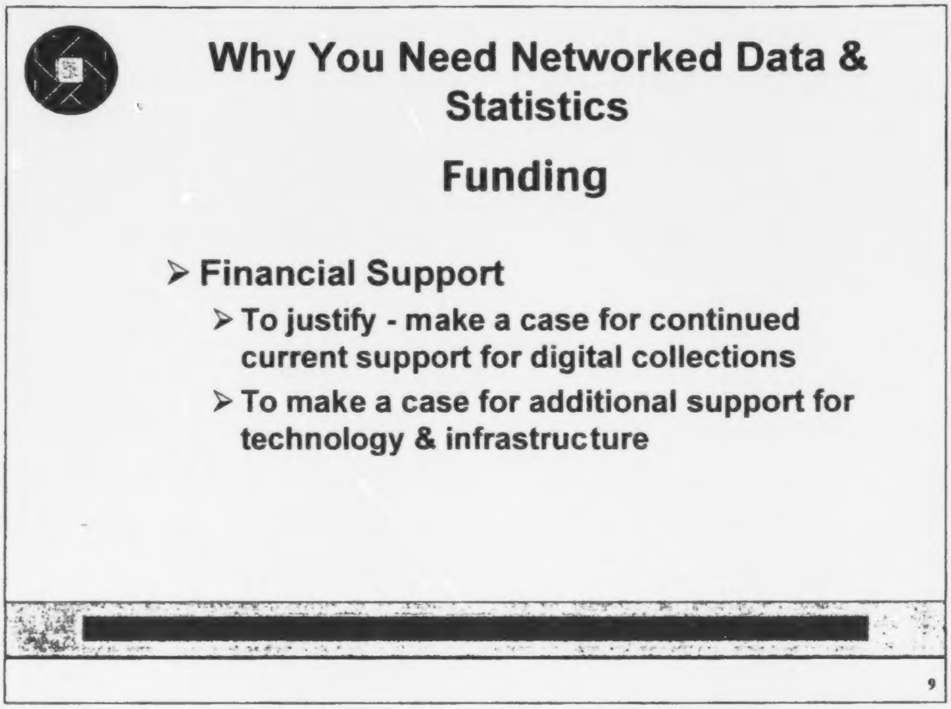
Source: ARL Statistics and Supplementary Statistics

Comparison of average annual increases in acquisitions expenditures in ARL libraries since 1992/93 to 1999/2000 show the following:

•The average increases for total materials expenditures is under 10% and is dropping.

•The average increases for electronic materials expenditures is always higher.

•Although the increase during 1993–1995 seem to be very high, they may be attributed to the rise of use of CDs at the time. With the arrival of the usable Web (browsing), the market shifted, but the increase in average expenditure for electronic resources never went below 15%, and does not show any slowdown.



Why You Need Networked Data & Statistics

Funding

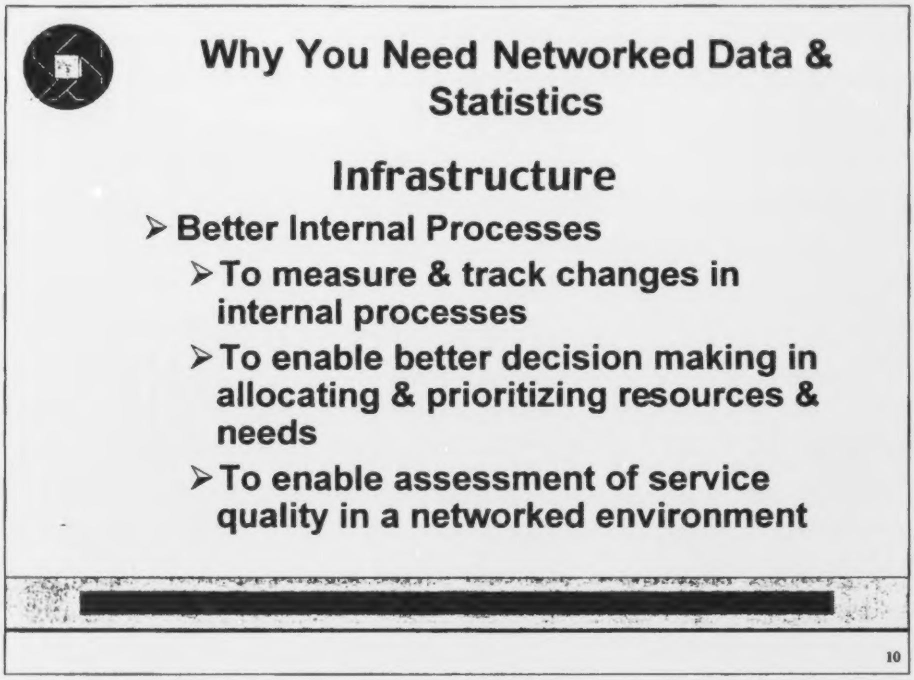
- Financial Support
  - To justify - make a case for continued current support for digital collections
  - To make a case for additional support for technology & infrastructure

The development of library networked statistics and performance measures is receiving increased attention and support. There is a broad recognition for the need of network statistics and performance measures that:

Need to Secure Funding for the Increased use of Networked Resources and Services:

•Assist libraries in demonstrating the use of digital collections in order to make a case for **continued** collection development and support; In a time of financial constraints, libraries have to make a case for continued levels of support – **no cutbacks.**

•Assist libraries in making a strong case for **additional support** of technology and information infrastructure by documenting their Internet-based services and resources; We need to demonstrate that IT infrastructure is essential for research and learning, costs are not dropping and demand for services are increasing.



Why You Need Networked Data & Statistics

Infrastructure

- Better Internal Processes
  - To measure & track changes in internal processes
  - To enable better decision making in allocating & prioritizing resources & needs
  - To enable assessment of service quality in a networked environment

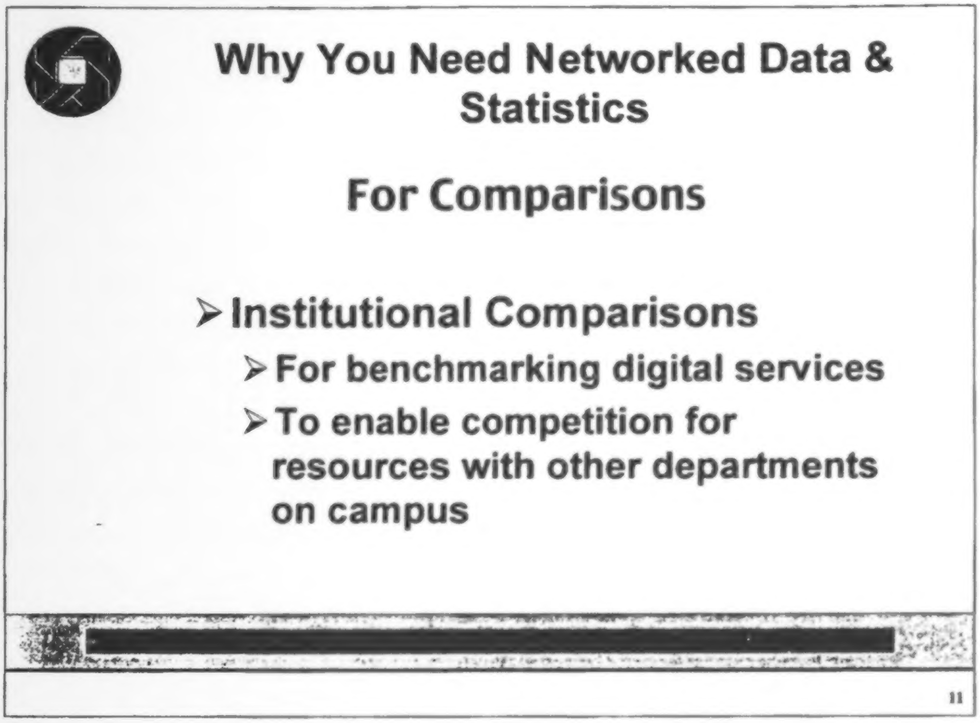
To demonstrate the need of building, maintaining, innovating, and delivering superior services based on sound local and networked resources and services:

•Allow libraries to **measure and track internal** changes to library operations as well as uses and users of library resources and services. This will allow libraries to measure quantity and quality of processes involved in enabling effective delivery of networked services. It will also allow for better space and staff planning.

•Provide a **decision-making framework** for library staff, managers, and administrators to determine resource allocation strategies and meet other management needs. A system designed to support managerial decision making and planning, and to be able to anticipate the future. Will allow allocation of resources and services based on the strategic goals of the institution.

•Provide a means by which to **measure the quality** of library services and resources in the networked environment. Will give a better picture of the expectations of our clients, their service expectations as well as how well the library is fulfilling those expectations. Will allow the libraries to be more proactive, controlling reliability of services—which is of utmost importance in a networked environment.

•Facilitate the expansion from traditional library use measures such as circulation, reference transactions, interlibrary loans, etc., to include network measures that describe the nature and use of library-based network activities and resources.



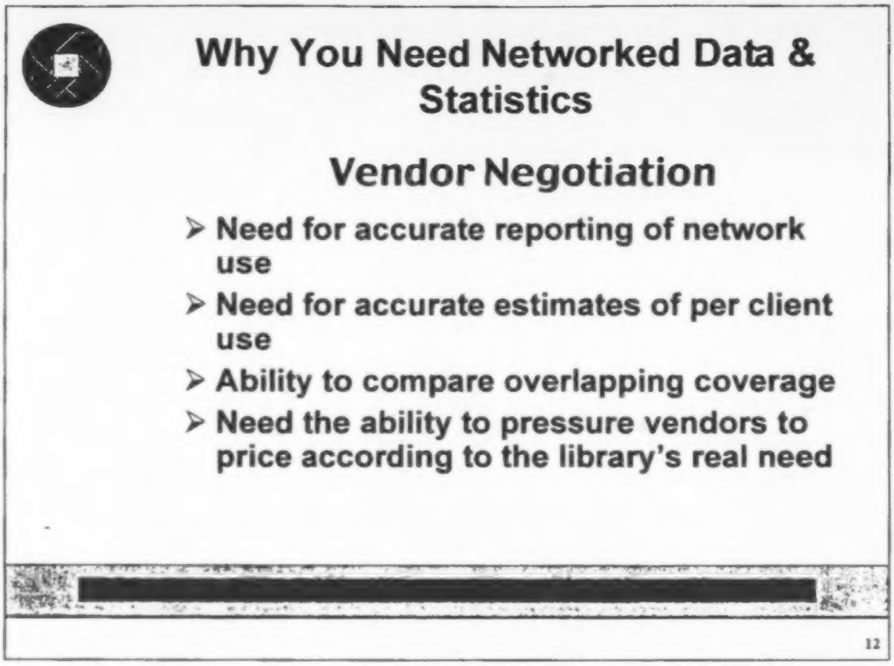
Why You Need Networked Data & Statistics

For Comparisons

- Institutional Comparisons
  - For benchmarking digital services
  - To enable competition for resources with other departments on campus

•Allow libraries to effectively compare themselves to others in terms of Internet-based collection and service development, costs, provision of services, connectivity, and use.

•Enable library directors and administrative library agencies to compete for resources with other organizations and/or departments by documenting the range, extent, and impact of library-provided networked services.



Why You Need Networked Data & Statistics

Vendor Negotiation

- Need for accurate reporting of network use
- Need for accurate estimates of per client use
- Ability to compare overlapping coverage
- Need the ability to pressure vendors to price according to the library's real need

Need for accurate reporting of network use

Libraries need accurate reporting of network use—this can only be done if vendors use standard, agreed upon, measures of use—as the activity can only be assessed on the server side. This information will also enable libraries to plan expansion of their networks, network capacity, bandwidth, and speed of delivery.

Need for accurate estimates of per client use

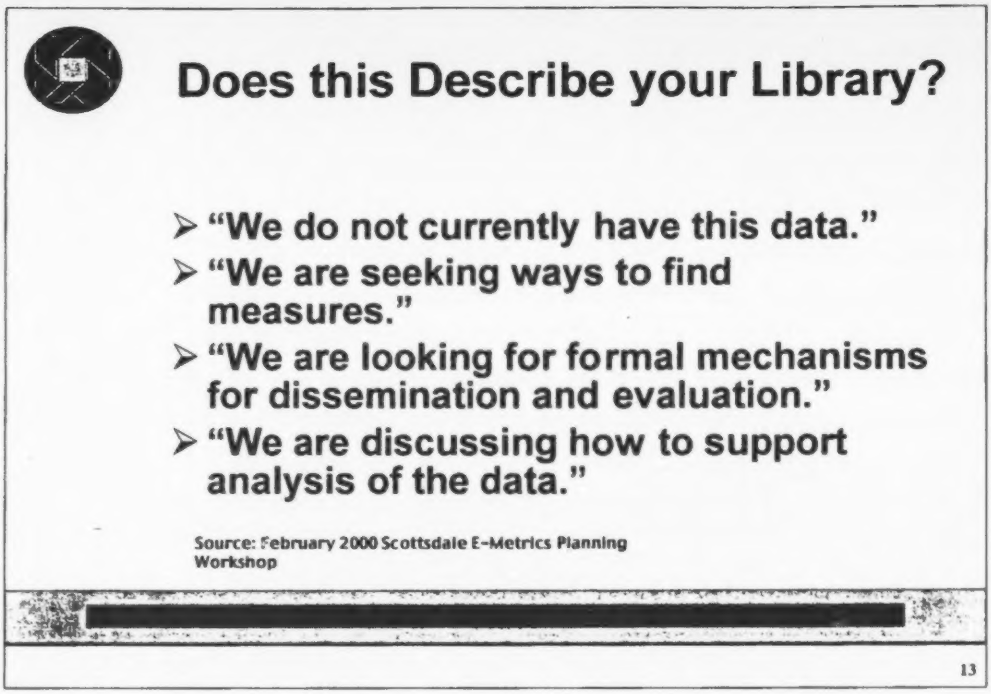
Libraries need to have better understanding of average network use per client, in order to enable better hardware, software, staff investment, as well as better know which services are in higher demand than other—this will help in network resource planning.

Ability to compare overlapping coverage

It is especially important to be able to compare resource overlap between vendors. Aggregators compete for coverage by the number of resources, full-text vs abstracts only, service quality, cost, etc. Libraries will have to be able to make acquisition decision based on this data.

Need the ability to pressure vendors to price according to the library's real need

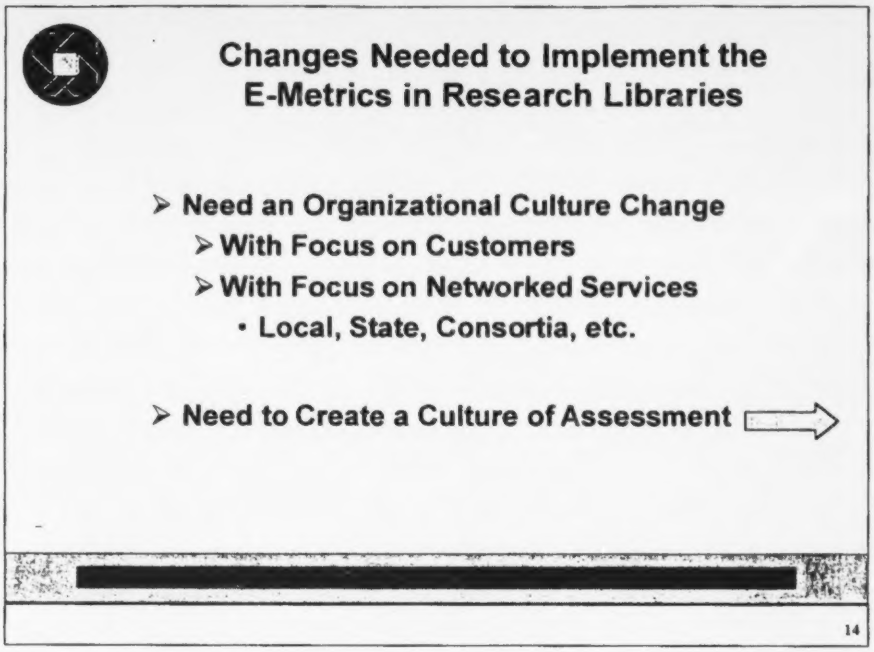
The current price models are in constant flux. Libraries at this time are disadvantaged by the conflicting price structures on the market. Libraries need to develop the ability to price the networks services according to local needs. This will only happen if libraries have accurate measures of service from the various overlapping vendors.



Does this Describe your Library?

- "We do not currently have this data."
- "We are seeking ways to find measures."
- "We are looking for formal mechanisms for dissemination and evaluation."
- "We are discussing how to support analysis of the data."

Source: February 2000 Scottsdale E-Metrics Planning Workshop



Changes Needed to Implement the E-Metrics in Research Libraries

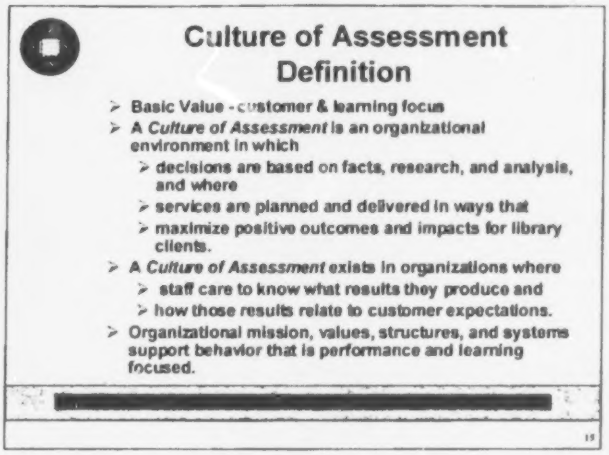
- ➢ Need an Organizational Culture Change
  - ➢ With Focus on Customers
  - ➢ With Focus on Networked Services
    - Local, State, Consortia, etc.
- ➢ Need to Create a Culture of Assessment ⇨

Organizational Culture Change

In educational institutions at all levels there is also general agreement on the need to foster collaboration in achieving institutional missions and that this requires a culture of improvement. Assessment within institutions is generally seen as a key lever for creating an institutional culture of improvement, inquiry, responsibility, and (in the language of some circles) quality.

The challenge associated with making assessment more influential in libraries is an amalgamation of the librarian profession's set of values and the parent organization's value set. A profession that sees itself as "doing good" is less concerned with outcomes and impacts, since it sees its activities as inherently positive. Assessment activities also require a certain skill set, which has not been readily available to the profession. The evolution of library activities into functional silos such as circulation, cataloguing, acquisition, reference service, imposed an organizational structure that assigned to the periphery the activities concerned with data, planning, surveys, etc. To change, libraries have to incorporate assessment into their everyday activities, they have to create structures for assessment activities and use these measures to create environments that are effective and truly client centred.

To focus on client needs, libraries must base their services on the expressed needs and requirements of their clientele, to deliver high quality service, and to find ways to ensure service quality. The focus on results, on outcomes, on added value is essential. These are the prerequisites for creating a culture of assessment.



Culture of Assessment Definition

- Basic Value - customer & learning focus
- A *Culture of Assessment* is an organizational environment in which
  - decisions are based on facts, research, and analysis, and where
  - services are planned and delivered in ways that
  - maximize positive outcomes and impacts for library clients.
- A *Culture of Assessment* exists in organizations where
  - staff care to know what results they produce and
  - how those results relate to customer expectations.
- Organizational mission, values, structures, and systems support behavior that is performance and learning focused.

15

Defining a "Culture of Assessment"

Definition:

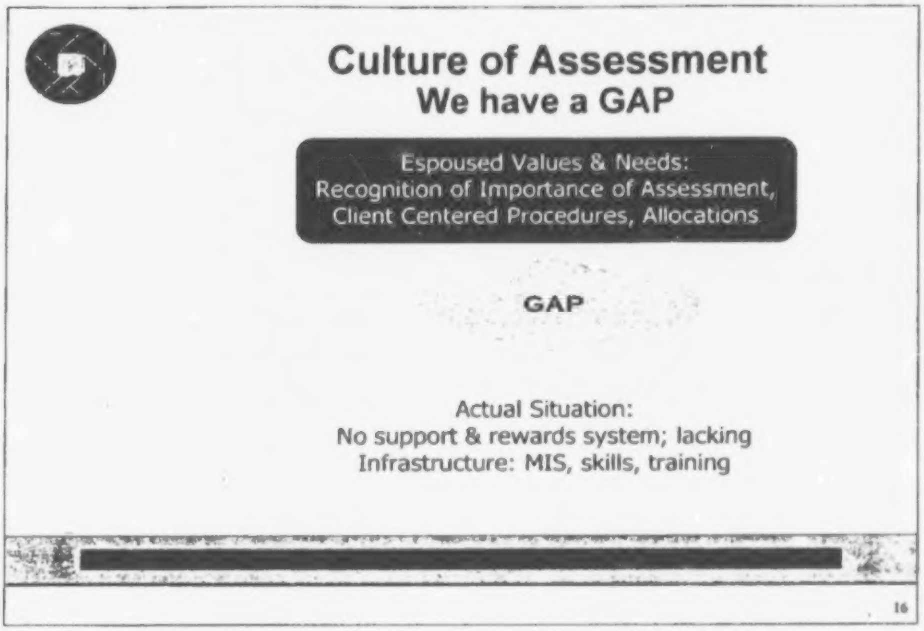
A Culture of Assessment is an organizational environment in which decisions are based on facts, research, and analysis, and where services are planned and delivered in ways that maximize positive outcomes and impacts for customers and stakeholders. A Culture of Assessment exists in organizations where staff care to know what results they produce and how those results relate to customers' expectations. Organizational mission, values, structures, and systems support behavior that is performance and learning focused.

A Culture of Assessment exists when:

- The library's mission, planning, and policies are focused on supporting the customer's information and communication needs
- Performance Measures are included in library planning documents such as strategic plans
- Library administrators are committed to supporting assessment
- Staff and leaders recognize the value of assessment and support and participate in assessment as part of their regular assignments
- Individual and organizational responsibility for assessment is addressed explicitly
- Continuous communication with customers is maintained through needs assessment, quality outcome and satisfaction measurements
- Relevant data and user feedback is routinely collected, analyzed, and used to set priorities, allocate resources, and make decisions
- Assessment activities can be supported by a Management Information System or Decision Support System
- All library services, programs, and products are evaluated for quality and impact
- Staff continuously improve their capability to serve customers and are rewarded for this
- Units and staff have customer focused S*M*A*R*T* goals which are monitored regularly
- Rewards support removing barriers to quality customer service
- On-going staff development in the area of assessment is provided and supported
- Staff appreciate feedback and support for achievement of performance and learning goals

Originally developed by Amos Lakos (University of Waterloo) and Betsy Wilson (University of Washington) – 1998

Revised and updated by Amos Lakos and Shelley Phipps (University of Arizona) – LTFIII- 2000



Culture of Assessment
We have a GAP

Espoused Values & Needs:
Recognition of Importance of Assessment,
Client Centered Procedures, Allocations

GAP

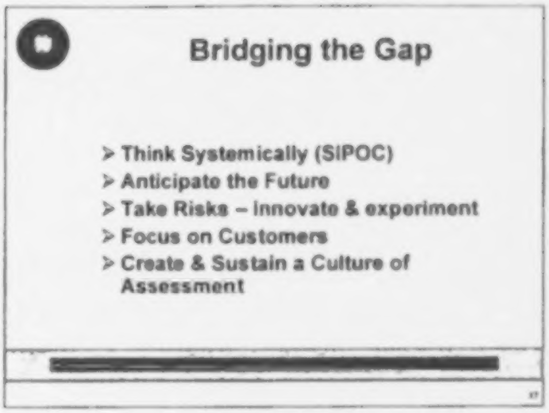
Actual Situation:
No support & rewards system; lacking
Infrastructure: MIS, skills, training

Applying the Culture of Assessment IQ Test in a number of ARL workshops and through the Service Quality Online Lyceum show that libraries have a gap between their understanding for their needs for doing more assessment in a systematic way and the actual actions they take.

In general, library leaders and librarians seem to recognize the importance of assessment, the need for developing policies and procedures to meet clients needs, to consider client needs in allocating resources.

However,

There is in general low level of support and reward mechanisms for staff engaged in assessment, there is a lack of infrastructure to support assessment work, almost no MIS in libraries, and not enough training and development of assessment based skills.



Bridging the Gap

- Think Systemically (SIPOC)
- Anticipate the Future
- Take Risks – innovate & experiment
- Focus on Customers
- Create & Sustain a Culture of Assessment

Systems Thinking

Based on the SIPOC model: suppliers, inputs, processes, outputs, customers. (see Peter Scholtes, The Leader's Handbook.)

Creating an assessment environment and the corresponding MIS infrastructure depends on seeing the whole picture, its various components, and the links between them. Administration and staff have to be encouraged to look beyond the details. Understanding organizational purpose, seeing the big picture, being customer-centered, and understanding the links and interrelations between goals, outcomes, processes, and constant change are of primary importance.

Anticipate the Future

It is important to be focused on the future, both from a strategic perspective and especially because e-metrics and network services are new and ever changing—and in ways we may not even envision. Which makes it even more important to be future focused.

Take Risks – innovate & experiment

Old processes and services should be phased out in order to focus on what is needed strategically. Since assessment work may be new and unfamiliar, and viewed as risky, risk should be encouraged. In essence, risk taking will have to be the norm in libraries.

Focus on Customers

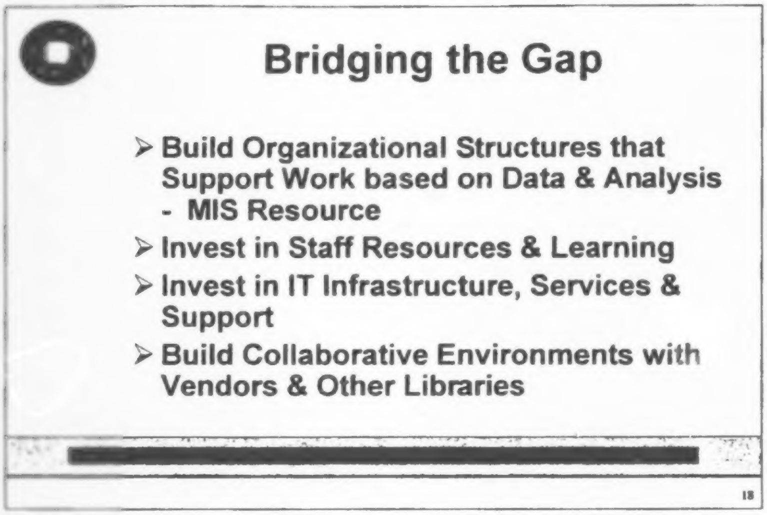
It is essential to think from the perspective of the customer. Libraries do not exist for librarians, but for the users of libraries and for people who are looking for education and information. Librarians have to value customer feedback and take the feedback seriously— they have to care about what their customers need.

Create & Sustain a Culture of Assessment

Culture of assessment is essential to maintaining libraries as relevant institutions in the new information environment. The culture of assessment pushes the organization forward toward focusing on customers and outcomes for customers. It encourages self-examination and openness between staff, customers, and other stakeholders. It becomes embedded in everyday processes and it is essential for dynamic organizational change. This in essence is one of the prerequisites to change that over time becomes accepted and changes the culture of the organization.

A culture of assessment is about learning how to learn. It is about developing the organization's and the individual's learning capabilities. It necessitates curiosity. The new competence, experience, and learning agility that is part of the creation of a culture of assessment leads to new confidence and enhanced expertise. This in turn leads to more effectiveness and more measurable outcomes and impacts for customers and stakeholders.

Organizational culture change still needs an amalgam of committed leadership, repeated articulation of purpose, time, and group learning to really penetrate the organization and take root. In this way, focus on achieving positive and tangible outcomes assisted by a culture of assessment will contribute to positive organizational culture change, but may not be decisive by itself. Assessment has to become part of the work processes, part of the organizational structure, part of organizational learning, and part of the decision-making loop, in order to impact the culture and act as a catalyst for organizational change. Culture of assessment has to become a basic value to the organization, it has to become embedded in everyday work, automatic, taken for granted—it has to become our culture.



Bridging the Gap

- ➢ Build Organizational Structures that Support Work based on Data & Analysis - MIS Resource
- ➢ Invest in Staff Resources & Learning
- ➢ Invest in IT Infrastructure, Services & Support
- ➢ Build Collaborative Environments with Vendors & Other Libraries

18

Build Organizational Structures that Support Work based on Data & Analysis - MIS Resource

A Management Information Service is set up in order to support the data and information needs of the organization. Library leaders who possess clearly defined expectations, and understand the need for data and information to support decision making, will support the MIS. The MIS unit will be responsible for the coordination of all assessment activities, identification of information needs, creation of an appropriate environment for organizing data and information, analysis of information, and making information available to the processing and management units of the library.

The need for management information systems in libraries was recognised over twenty years ago. One of the earliest and most persistent promoters of the necessity and advantages of MIS in libraries is Charles McClure who wrote about this already in the early 1980s (McClure, 1980). However, setting up an MIS or a DSS requires awareness, commitment, and resources. Current examples of functioning MIS systems in academic libraries are almost nonexistent. Setting up an MIS is not simple, but it will have benefits, especially as demands for accountability are increasing. A MIS will enhance the creation of assessment culture in libraries. In order to sustain quality services, institutions that aspire to be continuously effective and successful have to rely on decision support systems. An example of MIS development is work at the University of Waterloo Library and the Tri-University Library Group Consortia between 1993–1999 (Lakos, 1998) and newer MIS type implementations at the University of Virginia and the University of Pennsylvania Libraries.

Invest in Staff Resources & Learning

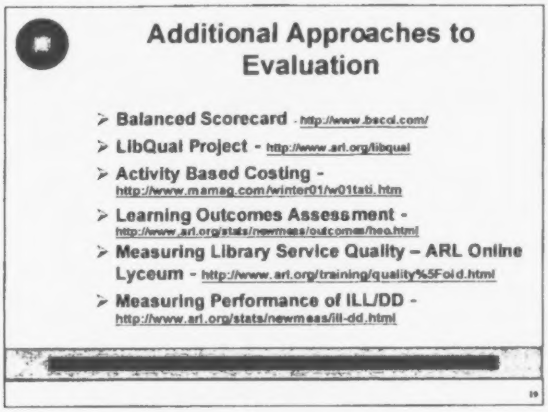
Staff development in all areas of assessment is needed. This includes training on appropriate information analysis tools and software as well as continuous skills upgrading in assessment work. Many librarians feel that they lack the technical and computer skills needed, and resist acquiring those skills. Many feel that they lack the skills to use data gathering techniques such as surveys and focus groups. They also are unsure about using statistics. Professionals hesitate working in areas where they lack knowledge, as this seems to signify lack of control. Lack of skills also creates lack of confidence. Much assessment is not carried out because staff lacks the confidence to try out new and unfamiliar activities. The skills issue may also be aggravated by a lack of well-organized technical support for non-technical staff. Without this supportive environment, staff's capability to use assessment and analysis tools is derailed.

Invest in IT Infrastructure, Services & Support

Libraries have to plan in building reliable IT infrastructures, with superior staff resources and well integrated services. IT overall has to be developed from a service perspective— which means from a customer perspective. Libraries should understand the importance of IT for the delivery of networked services, but these services have to be part of the larger picture— they should support and enable—not drive.

Build Collaborative Environments with Vendors & Other Libraries

A superior network service environment cannot be developed in isolation. Local resources are not effective in delivering information and services in the new reality. For this reason, developing relationships with both vendors and other libraries is essential. Libraries understand the need for managing resources and services in a new— effective—cooperative mode. They also understand that cooperation (in the form of consortia) or other modes of collaboration can be used to leverage better service deals with vendors, as well as deliver better services to their local clients.



Additional Approaches to Evaluation

- Balanced Scorecard - http://www.bscol.com/
- LibQual Project - http://www.arl.org/libqual
- Activity Based Costing - http://www.mamag.com/winter01/w01tati.htm
- Learning Outcomes Assessment - http://www.arl.org/stats/newmeas/outcomes/heo.html
- Measuring Library Service Quality – ARL Online Lyceum - http://www.arl.org/training/quality%5Fold.html
- Measuring Performance of ILL/DD - http://www.arl.org/stats/newmeas/ill-dd.html

[redacted]

19

Additional Approaches to Evaluation

Balanced Scorecard - http://www.bscol.com/

The Balanced Scorecard developed by Robert Kaplan and David Norton describes a strategically oriented set of performance indicators that are grouped into four perspectives: financial, customer, internal processes, and learning and growth. The idea is to link performance measurements to strategy. The balanced scorecard gives managers a framework of integrating and coordinating their activities and linking their strategies to performance metrics and ties them to compensation systems in a meaningful way. This also helps the development of non-financial measures and assigns to them measurable values. Over time, there were many diverse implementations of the balanced scorecard and it was also adapted to the non-profit sector. Adapting the balanced scorecard to the library environment is possible and will tie our strategic purposes to our processes and rewards and give a coherent framework to our assessment endeavors.

LibQual Project - http://www.arl.org/libqual

LibQUAL+ is a research and development project undertaken by ARL in collaboration with Texas A&M University and with financial support from the U.S. Department of Education's Fund for the Improvement of Postsecondary Education (FIPSE) through September 2003. LibQUAL+ is defining and measuring library service quality across institutions and creating useful quality-assessment tools for libraries; it is one of the ARL New Measures Initiative projects, which seek to develop innovative ways for libraries to describe their contributions to their institutions. The goals of LibQUAL+ are:

•establish a library service quality assessment program at ARL;

•develop Web-based tools for assessing library service quality;

•develop mechanisms and protocols for evaluating libraries; and

•identify best practices in providing library service.

Service quality has always been a value for libraries--LibQUAL+ provides a measure of that value. LibQUAL+ currently tests a tool for measuring library users' perceptions of service quality and identifies gaps between desired, perceived, and minimum expectations of service. The project will continue as an R&D endeavor through 2003, by which time it is anticipated that LibQUAL+ will evolve into an ongoing service quality assessment program at ARL.

Activity Based Costing - http://www.mamag.com/winter01/w01tati.htm

Higher Education Institutions (HEIs) are in a state of turmoil and fiscal crisis. Escalating costs, diminishing resources, increased competition, unhappy customers (students, parents), and state legislators demanding accountability are pressuring them to manage their costs better. These pressures are not much different from those experienced by the manufacturing industry of yesterday. Using tools and techniques such as activity-based costing (ABC), business process reengineering, concurrent engineering, and total quality management, manufacturers gained a better understanding of costs, simplified products and procedures, eliminated waste, cut costs, reduced lead times, improved quality, added value, and gained customer satisfaction and loyalty. Though activity-based costing is used successfully by a variety of manufacturing and service industries, educational institutions are lagging. Only a few colleges and universities in the United States apply ABC. In Great Britain several universities have recently introduced ABC accounting. These universities found that ABC helped them with tighter financial management and better resource allocation.

Learning Outcomes Assessment - http://www.arl.org/stats/newmeas/outcomes/heo.html

The goal for this project is to collaboratively develop a strategy for involving research libraries in campus assessment activities and to demonstrate the value of the library to the learning community. Interested ARL directors are invited to assist in reviewing higher education outcomes and defining a process for libraries to develop learning and research outcomes within their parent institution context. The HEO project is an overarching activity in which some of the more specific measures projects can be placed. Current activities are supported with funding from interested ARL libraries.

Measuring Library Service Quality – ARL Online Lyceum - http://www.arl.org/training/quality%5Fold.html

The course will cover the background and theory of measuring service quality, methods to assess and improve service, and the impact of measuring service quality on overall library value to constituencies. A case study approach to problem solving will provide the content and context for developing and understanding measurement techniques.

In this course you will learn:

•what measurement of service quality means;

•theoretical basis for measurement of service quality;

•practical methods for measuring service quality; and

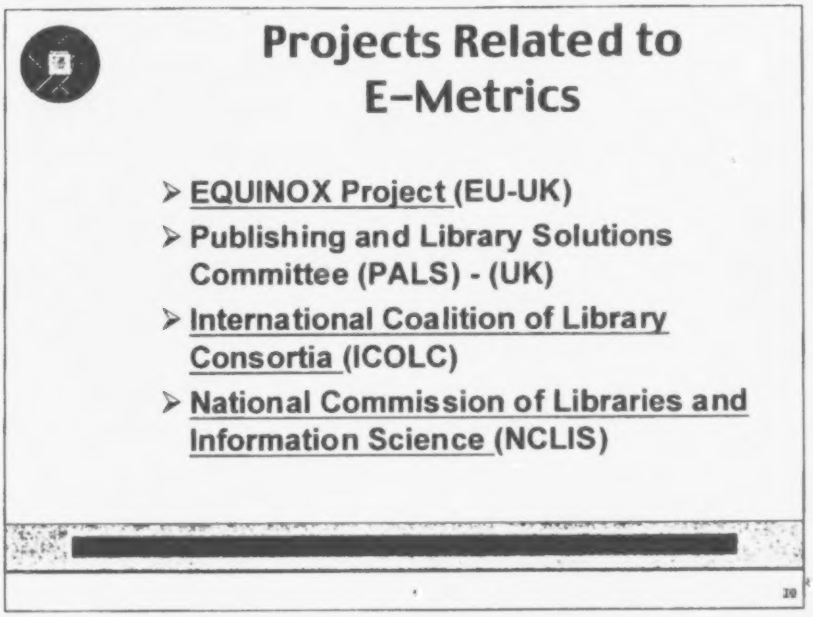
•how to apply theory and methods in the local setting.

This Online Lyceum Collaborative Learning Event will incorporate elements of both synchronous (real-time) and asynchronous interaction with course facilitators and a global peer network of up to thirty learners via a course bulletin board, chat rooms, and regular email.

Measuring Performance of ILL/DD - http://www.arl.org/stats/newmeas/ill-dd.html

This effort is in development by Mary E. Jackson, ARL Senior Program Officer for Access & Delivery Services. She is utilizing the lessons learned from the ILL/DD Performance Measures cost study and the experience gained from the workshops on organizational re-design to improve internal workflows and procedures followed in interlibrary loan and document delivery departments.

BEST COPY AVAILABLE



Projects Related to E-Metrics

- **EQUINOX Project (EU-UK)**
- **Publishing and Library Solutions Committee (PALS) - (UK)**
- **International Coalition of Library Consortia (ICOLC)**
- **National Commission of Libraries and Information Science (NCLIS)**

•European Commission EQUINOX Project.

The Equinox project, funded by the European Union, primarily focuses on developing performance measures for networked services and resources in European academic libraries. This project continues, but has shifted from performance indicators to software development to assist libraries to assess their network-based services (see http://equinox.dcu.ie/).

•Publishing and Library Solutions Committee (PALS) Working Group on Online Vendor Usage Statistics (UK)

The Publishing and Library Solutions Committee (PALS) Working Group on Online Vendor Usage Statistics, established in the U.K. and chaired by Richard Gedye, Journals Sales and Marketing Director, Oxford University Press, will address the following:

•Research current and planned availability of vendor-based usage statistics for online products.

•Research current initiatives to develop accepted codes of practice/guidelines in this area.

•Research current library wants.

•Produce realistic code of practice/guidelines.

•Market the code of practice/guidelines to vendors and hosting systems; get them accepted/adhered to.

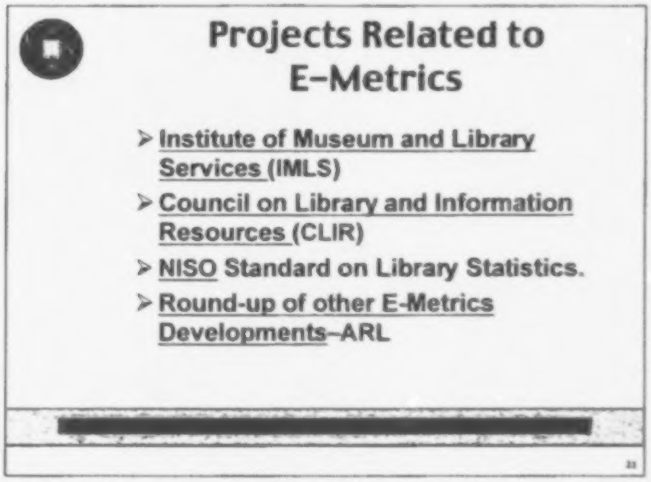
•Research the possibility of centralized provision, e.g., a usage statistics clearinghouse.

•International Coalition of Library Consortia (ICOLC) review of ICOLC Guidelines for Statistical Measures of Usage of Web-based Indexed, Abstracted, and Full-Text Resources.

Since the mid-90s, an international coalition of libraries—predominantly academic—have been working towards a standard set of definitions for online database services. Current definitions reflect work completed in December 2001 (see http://www.library.yale.edu/ consortia/webstats.html).

•National Commission of Libraries and Information Science (NCLIS) project to standardize online database usage statistics and reporting mechanisms (public libraries).

NCLIS works cooperatively with NCES in implementing the Library Statistics Cooperative Program. NCLIS serves as a liaison to the library community, organizes meetings and training workshops, organizes training and technical assistance, monitors trends, and advises NCES on policy matters.



Projects Related to E-Metrics

- **Institute of Museum and Library Services** (IMLS)
- **Council on Library and Information Resources** (CLIR)
- **NISO** Standard on Library Statistics.
- **Round-up of other E-Metrics Developments**–ARL

[redacted]

21

•Institute of Museum and Library Services (IMLS) project to develop national network online statistics and performance measures for public libraries.

•IMLS sponsored the researchers to develop national network statistics and performance measures for public libraries. That project resulted in a network statistics manual for public libraries (Bertot, McClure, and Ryan, 2000). This work continues with renewed sponsorship by IMLS and NCLIS to develop a national data collection system for public library network statistics (see http://www.ii.fsu.edu). [Note: researcher involvement].

•Council on Library and Information Resources (CLIR) report by consultant Judy Luther related to network statistics.

•CLIR has engaged consultants to review the state of the art of network statistics, analysis, and presentation in the academic library and consortia environments. The report is expected in fall 2000, and there is an indication that this work will continue.

•NISO forum on performance measures and statistics for libraries in preparation to evaluate the NISO Standard on Library Statistics

•The National Information Standards Organization (NISO) is undertaking a review and update of its *z39.7 – Library Statistics* standard. This review and update will consider network services and resources statistics and performance measures. As of October 2000, the planning committee for the standard is just forming and beginning to meet to develop the review process (see http://www.niso.org).

Round-up of Other E-Metrics Developments—ARL

Some are already mentioned above, but we can add the following:

DLF Initiative

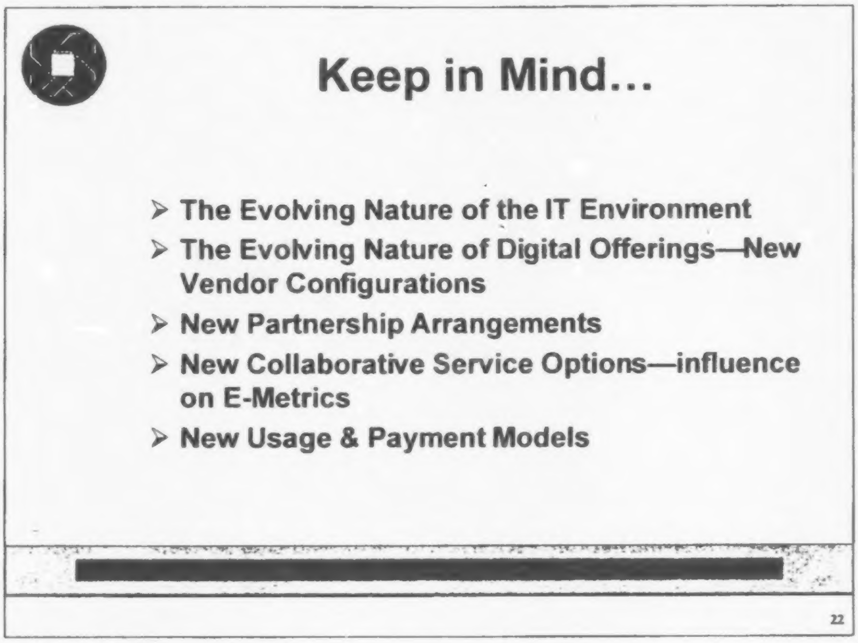
The Digital Library Federation (DLF) named Denise Troll, Assistant University Librarian for Library Information Technology at Carnegie Mellon University Libraries, a DLF Distinguished Fellow to spearhead the part of the DLF's program that aims to identify and evaluate measures that are appropriate for assessing the use and effectiveness of digital library collections and services. For more information, see <http://www.clir.org/diglib/use.htm>.

Recent Publications

Statistics and Performance Measures for Public Library Networked Services, by John Carlo Bertot, Charles R. McClure, and Joe Ryan. Chicago: American Library Association, October 2000. This book recommends 13 national statistics and measures for public libraries.

Performance Measures for Federal Agency Websites, by Charles R. McClure, J. Timothy Sprehe, and Kristin Eschenfelder. Washington: U.S. Government Printing Office, October 2000. This report analyzes the impact of federal policies affecting Web site development and proposes 17 performance measures.

White Paper on Electronic Journal Usage Statistics, by Judy Luther. Washington: Council on Library and Information Resources, October 2000. This white paper calls for working with publishers to facilitate the development of statistics in the industry. See <http://www.clir.org/pubs/reports/pub94/contents.html>.



Keep in Mind...

- ➢ The Evolving Nature of the IT Environment
- ➢ The Evolving Nature of Digital Offerings—New Vendor Configurations
- ➢ New Partnership Arrangements
- ➢ New Collaborative Service Options—influence on E-Metrics
- ➢ New Usage & Payment Models

The Evolving Nature of the IT Environment

The IT environment is constantly changing and the rate of change is very rapid. The IT environment is moving toward the wireless, Web-based content and services and is becoming increasingly interactive and based on multimedia. The cost of upgrading to new infrastructure has to be planned.

The Evolving Nature of Digital Offerings—New Vendor Configurations

There is always new content developed and being packaged and repackaged. New search modules are constantly being developed. The business models are in constant state of change and new vendor configurations are always emerging. Some players will change, disappear, morph, and will be consolidated.

New Partnership Arrangements

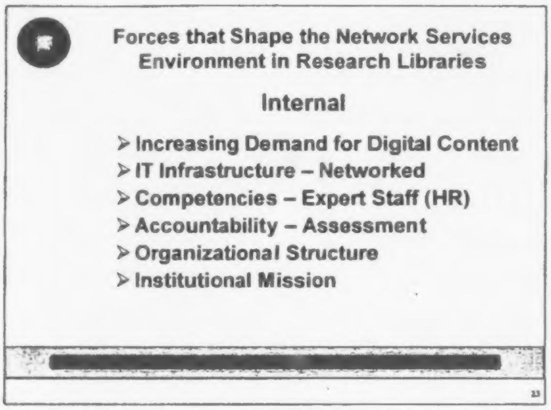
The market changes constantly and vendors as well as libraries are always looking for new partnership models in order to deliver services more effectively and in order to be more cost effective.

New Collaborative Service Options—influence on E-Metrics

Vendor consolidation, publishing consolidation, as well as new technological advancements will mean new service options—usually better options. Libraries have to be aware of these changes and act in order to take advantage of them. The new models will have to be integrated in such a way that the E-Metrics measures will become more current and easier to manage.

New Usage & Payment Models

With better ways to capture and analyze usage, information will be available—and may be better used to develop more realistic costing models. The idea is to move to the pay as you go model.



Forces that Shape the Network Services Environment in Research Libraries

Internal

- ➢ Increasing Demand for Digital Content
- ➢ IT Infrastructure – Networked
- ➢ Competencies – Expert Staff (HR)
- ➢ Accountability – Assessment
- ➢ Organizational Structure
- ➢ Institutional Mission

Content is Digital

Supply – phenomenal increase
Demand for Services – increases
Persistent Remote Access
New Business Models – serial suites, pay as you go
Competition from Alternative Information Services - Questia, etc.

Future is Digital

•In the future most information will be digital. In a digital environment it will be important to assess this environment in order to exist in it.

IT Networks Everywhere

•Everything – information, communication, transactions will be interconnected. Information services will all be digital — therefore libraries need to survive as part of a new networked environment and stay relevant.

Society demands information literate and skilled workers.

•Education institutions will be pressured to produce graduates who are skilled in the digital environment—this will be one of the most measured outcomes.

Competition from Alternative Information Services

•Libraries will have much more intense competition from other information services. Depending on demand, efficiency and effectiveness

---

IT Infrastructure – networked

IT Environment - evolving & unstable
Local IT Infrastructure - evolving, unstable & expensive
Portals – Transformational Choice
Wireless & Portable Devices

Competencies (HR)

Visionary Leadership
Library Staff – Expertise + Continuous Learning
IT Expertise – retention & training
Staff for Infrastructure Support – MIS & Systems

Accountability

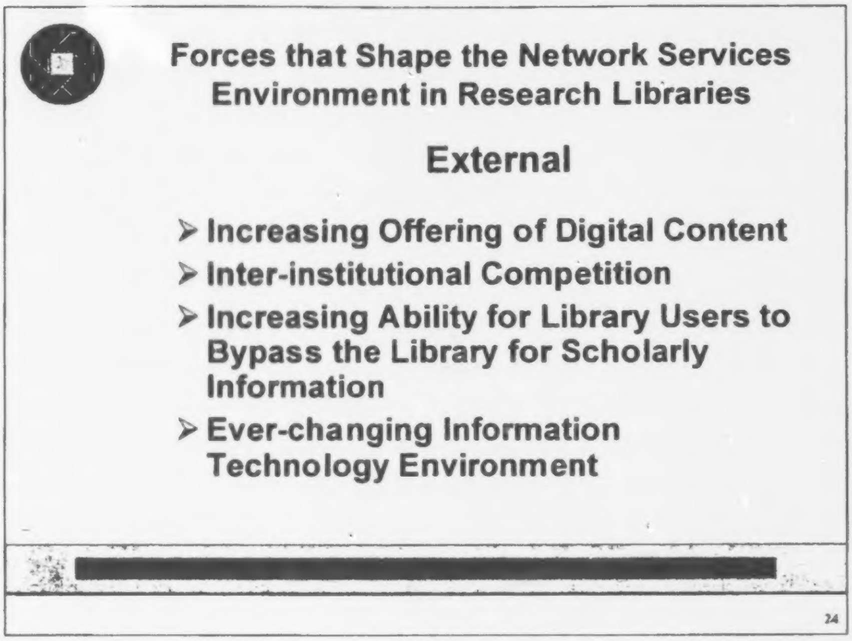
•Demanded by Stakeholders, Accreditation Agencies
•Society Demands Information Competent or Skilled Workers (learning outcomes)
•Need for Understand/Do Assessment (outcomes & impacts)
•Need to Demonstrate Value & Service Quality.
•Increasing demand for libraries to demonstrate outcomes/impacts in areas important to the institution.
•Increasing pressure to maximize use of resources – bench mark best practices to save or reallocate resources.

Organizational Structure

No functional silos
Everything Is interconnected – linked
Flatter organization
Customer focused
Understands the need for assessment – closing the assessment loop

Institutional Mission

Articulated Purpose
Positive Leadership
Externally Focused
Customer Focused
Processes, Staffing & Rewards are tied to strategic goals



Forces that Shape the Network Services Environment in Research Libraries

External

- Increasing Offering of Digital Content
- Inter-institutional Competition
- Increasing Ability for Library Users to Bypass the Library for Scholarly Information
- Ever-changing Information Technology Environment

[redacted]

Increasing Offering of Digital Content

Much more digital content – no stop to this at all

Inter-institutional Competition

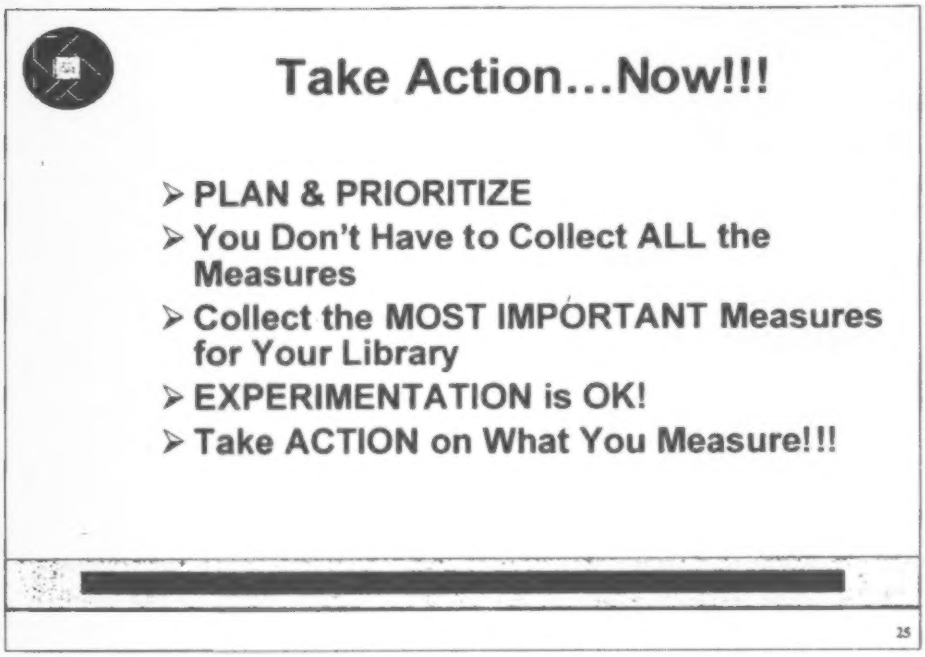
Continued inter-institutional competition for students & resources.

Increasing Ability for Library Users to Bypass the Library for Scholarly Information

New content, new devices and services, and new businesses that will be able to create information services that work at a realistic price will enable clients to bypass libraries.

Ever-changing Information Technology Environment

IT will continue to change at much faster rate than institutions will be able to absorb it.



Take Action…Now!!!

- PLAN & PRIORITIZE
- You Don't Have to Collect ALL the Measures
- Collect the MOST IMPORTANT Measures for Your Library
- EXPERIMENTATION is OK!
- Take ACTION on What You Measure!!!

PLAN & PRIORITIZE

To be effective in this rapidly change environment libraries have to plan and make priorities and they will only be able to do this if they have the right information.

You Don't Have to Collect ALL the Measures

Libraries don't have to measure all at once. Collect what you can, learn, add resources as you learn.

Collect the MOST IMPORTANT Measures for Your Library

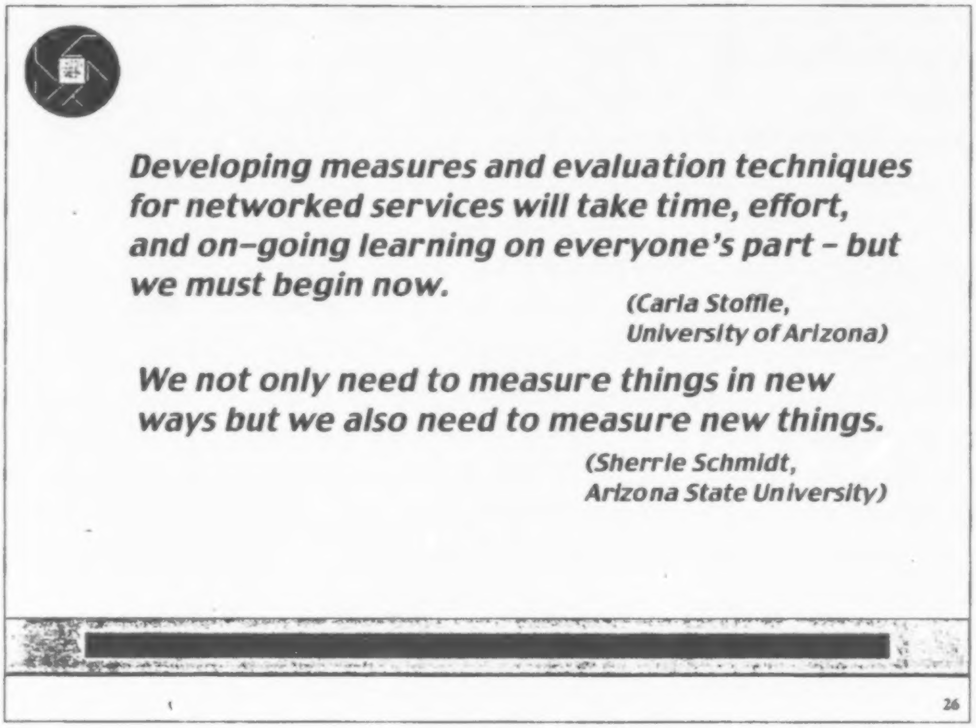
Identify and collect what is important to you locally. Identify what it is and focus on it first.

EXPERIMENTATION is OK!

It is OK to experiment. It is OK to take chances. You learn by experimenting. E-Metrics is new. We are all experimenting.

Take ACTION on What You Measure!!!

Implement changes based on what you learn from your measurement activities. Your staff and stakeholders want to see that your actions have results.

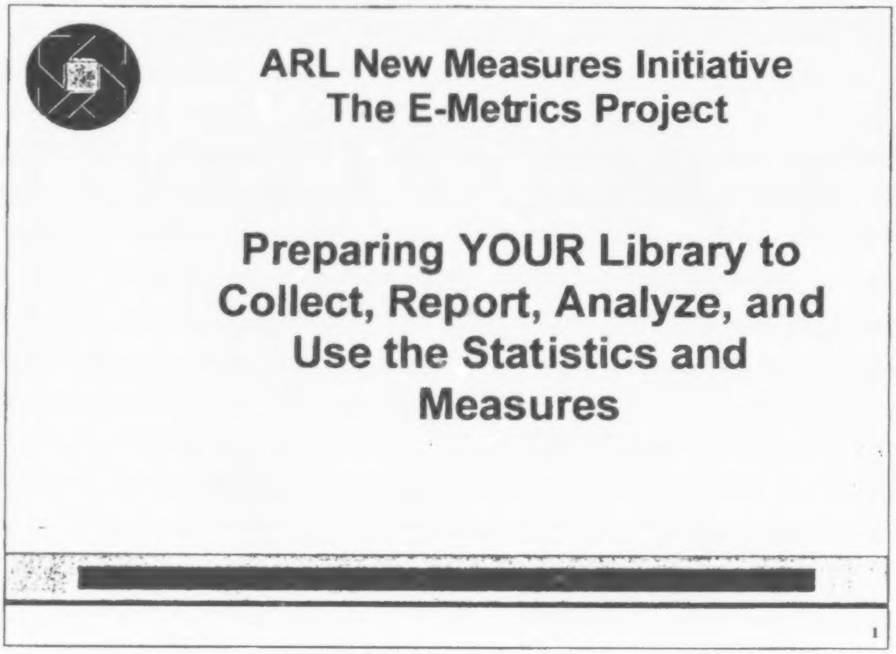


Developing measures and evaluation techniques for networked services will take time, effort, and on-going learning on everyone's part – but we must begin now.

(Carla Stoffle,
University of Arizona)

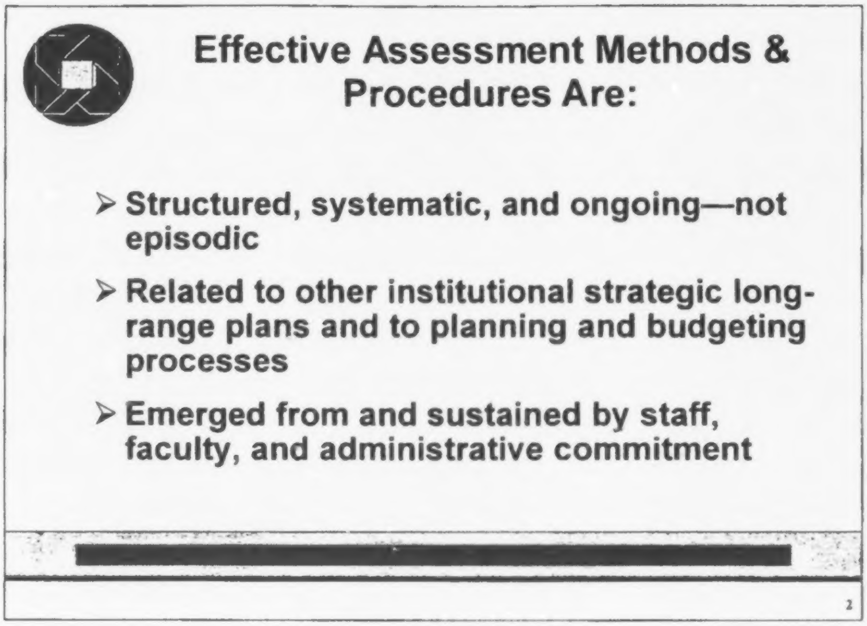
We not only need to measure things in new ways but we also need to measure new things.

(Sherrie Schmidt,
Arizona State University)



ARL New Measures Initiative
The E-Metrics Project

Preparing YOUR Library to Collect, Report, Analyze, and Use the Statistics and Measures



Effective Assessment Methods & Procedures Are:

- Structured, systematic, and ongoing—not episodic
- Related to other institutional strategic long-range plans and to planning and budgeting processes
- Emerged from and sustained by staff, faculty, and administrative commitment

Effective Assessment Methods & Procedures Are

Structured, systematic, and ongoing—not episodic

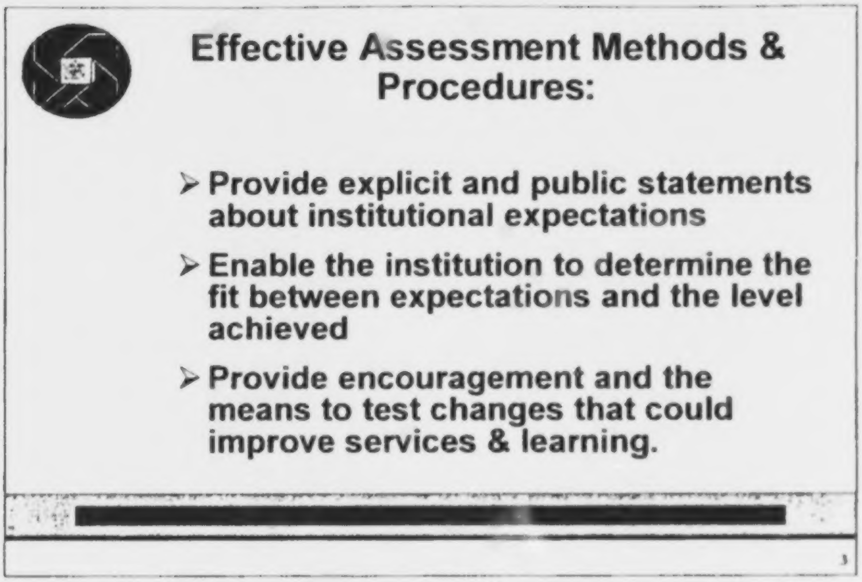
Assessment activities have to be ongoing—have to take place over time—and they have to be systematic. They need structure to be able to be sustained over time. Only over time will assessment show the big picture.

Related to other institutional strategic long-range plans and to planning and budgeting processes

Assessment should relate directly to institutional strategic plan, if there is one. Any assessment should be part of a planning framework. This will help integrate the assessment activity into the institutional processes and outcomes.

Emerged from and sustained by staff, faculty and administrative commitment

Assessment work should be developed systemically by involving staff at all levels. This way staff will understand the purpose behind the assessment effort.



Effective Assessment Methods & Procedures:

- Provide explicit and public statements about institutional expectations
- Enable the institution to determine the fit between expectations and the level achieved
- Provide encouragement and the means to test changes that could improve services & learning.

Effective Assessment Methods & Procedures:

Provide explicit and public statements about institutional expectations

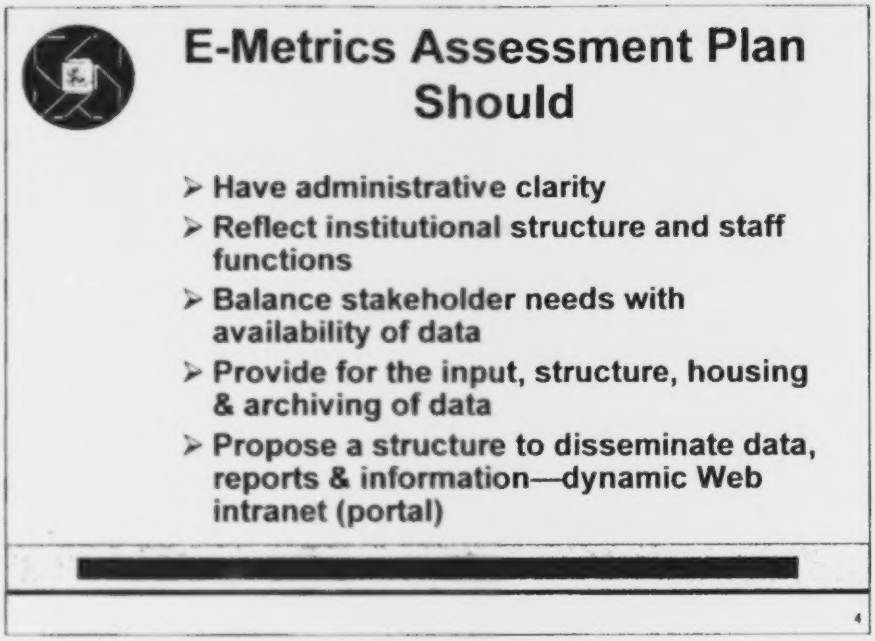
The assessment activities should be based on explicit institutional commitments which are apparent in institutional missions and policies and should reflect institutional expectations. These commitments should reflect the values of the institution and its modes of operation.

Enable the institution to determine the fit between expectations and the level achieved

The outcomes of the assessment should help the institution determine if the service expectations are realistic, if the work processes should be adjusted to achieve a better fit between expectations and results.

Provide encouragement and the means to test changes that could improve services & learning.

The information gleaned from the assessment should show directions for change—it should enable the institution to prioritize investment and to change processes for the better.



E-Metrics Assessment Plan Should

- Have administrative clarity
- Reflect institutional structure and staff functions
- Balance stakeholder needs with availability of data
- Provide for the input, structure, housing & archiving of data
- Propose a structure to disseminate data, reports & information—dynamic Web intranet (portal)

4

E-Metrics Assessment Plan Should

Have administrative clarity

There should be clarity of in the administrative structure for assessment. There should be clear lines of responsibility and accountability.

Reflect institutional structure and staff functions

Assessment plan and activities should reflect the institution's structure and the functions of the staff who do the work. Data and information should be structured to reflect the organization's structure.

Balance stakeholder needs with availability of data

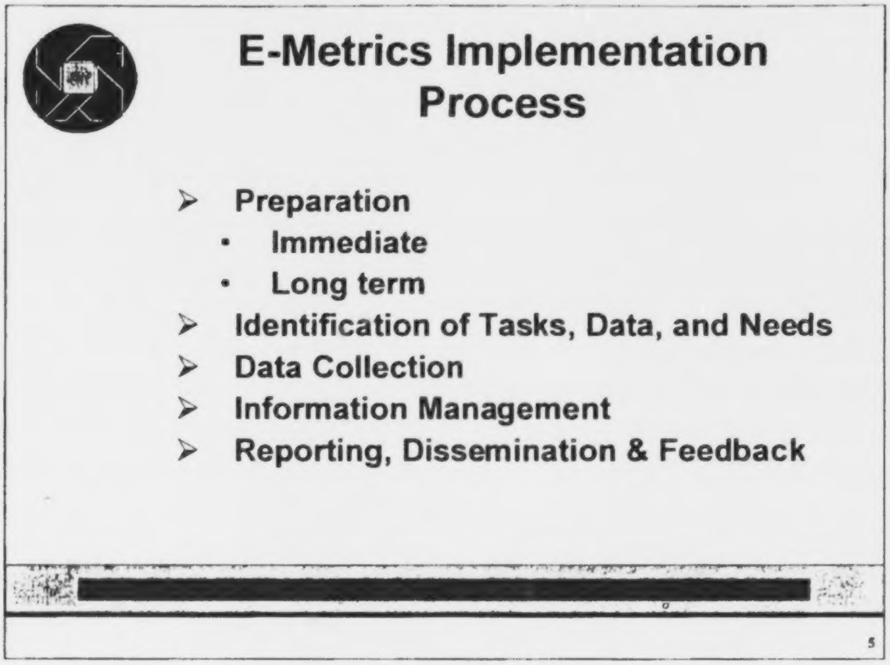
Know stakeholders needs, but adjust to what is possible. You can only measure based on availability of data. This should be always made clear.

Provide for the input, structure, housing & archiving of data

Plan to organize your data based on your organization's needs and structure, so that it makes sense to those who use it. Plan for security of the input data, for archiving the data for long term analysis.

Propose a structure to disseminate data, reports & information – dynamic Web intranet (portal)

Involve staff in developing the format they need the information in. It is important that the outcome is usable, that staff who need the information receive it, search it, have the capability to manipulate it. Plan to make all information available in a Web environment, possibly in a portal environment.



E-Metrics Implementation Process

- Preparation
  - Immediate
  - Long term
- Identification of Tasks, Data, and Needs
- Data Collection
- Information Management
- Reporting, Dissemination & Feedback

E-Metrics Implementation Process

Preparation

Immediate—short term

Long term

Prepare the institution for the E-Metric project.

Identification of Tasks, Data, and Needs

Identify all the activities, stakeholder need,s and data elements of the project.

Data Collection

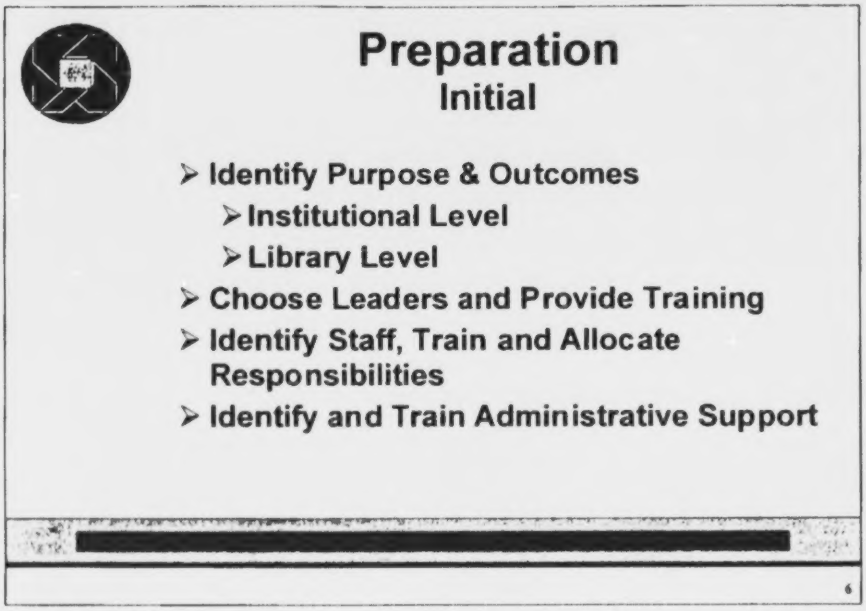
Describe in detail the processes of data collection.

Information Management

Set up an infrastructure to manage information and to analyse information.

Reporting, Dissemination & Feedback

Set up an infrastructure to create and use reports. Set up a mechanism to record and analyse feedback. Set up a method to analyse the whole process. Close the feedback loop.



Preparation

Initial

- Identify Purpose & Outcomes
  - Institutional Level
  - Library Level
- Choose Leaders and Provide Training
- Identify Staff, Train and Allocate Responsibilities
- Identify and Train Administrative Support

Preparation: Initial

Identify Purpose & Outcomes

Institutional Level: Mission, vision, general goals of the institution

Library Level: How does the above relate and inform the library's goals?

Choose Leaders and Provide Training

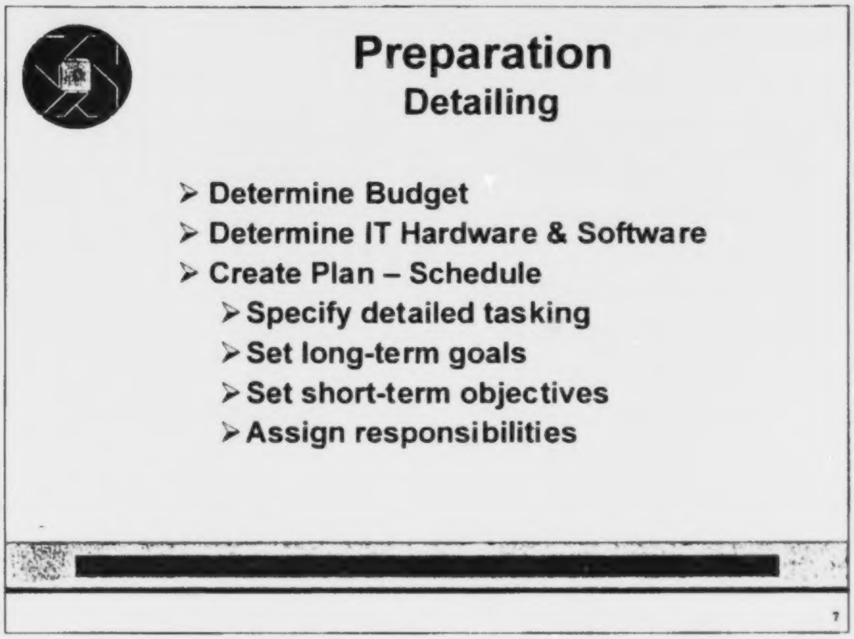
Identify leaders for the project and educate them about its purposes.

Identify Staff, Train, and Allocate Responsibilities

Identify units, staff. Allocate responsibilities and provide training.

Identify and Train Administrative Support

Identify administrative support needed. Define responsibilities, schedules, training.



Preparation

Detailing

- Determine Budget
- Determine IT Hardware & Software
- Create Plan – Schedule
  - Specify detailed tasking
  - Set long-term goals
  - Set short-term objectives
  - Assign responsibilities

Preparation - Detailing

Determine Budget

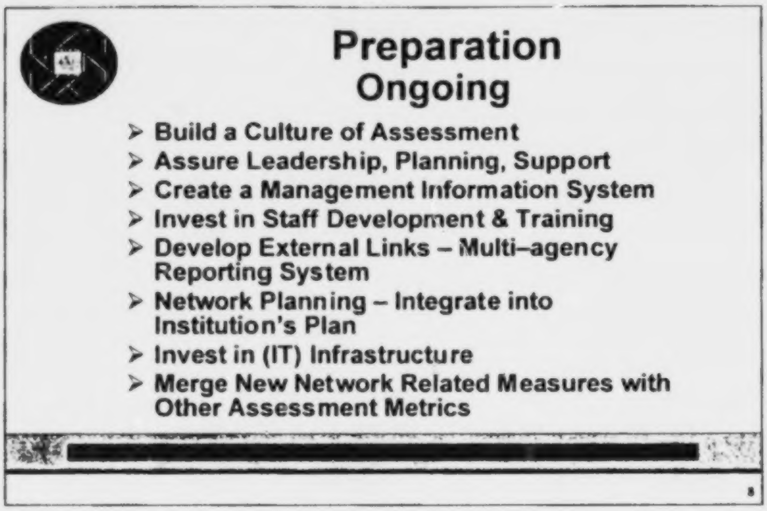
Outline initial and ongoing budgets.

Determine IT Hardware & Software

Identify IT needs. Go into detail: how much, where, what software, support, etc.

Create Plan – Schedule

Specify detailed tasking
Set long-term goals
Set short-term objectives
Assign responsibilities



Preparation
Ongoing

- Build a Culture of Assessment
- Assure Leadership, Planning, Support
- Create a Management Information System
- Invest in Staff Development & Training
- Develop External Links – Multi–agency Reporting System
- Network Planning – Integrate into Institution's Plan
- Invest in (IT) Infrastructure
- Merge New Network Related Measures with Other Assessment Metrics

Preparation – Ongoing

This should be done all the time, so as not to get stale and forget the goals.

Build a Culture of Assessment

Libraries have to create environments that enable successful assessment and the implementation of results based on these assessments. In other words, libraries need to create organizational cultures that are focused on effective outcomes for customers. The culture change needed will be greatly enhanced by the adoption of a culture of assessment.

How do we create a culture of assessment? What hinders and what helps us in this endeavour? Most management studies stress the importance of measurement activities for ensuring business and organizational success.

Assure Leadership, Planning, Support

Leadership is always needed in order to get a project off and to maintain it over time. Without leadership, this process of change will not work. Need to create a framework of planning and support.

Create a Management Information System

A Management Information Service is set up in order to support the data and information needs of the organization. Library leaders who possess clearly defined expectations, and understand the need for data and information to support decision making, will support the MIS. The MIS unit will be responsible for the coordination of all assessment activities: identification of information needs, creation of an appropriate environment for organizing data and information, analysis of information ,and making information available to the processing and management units of the library.

Invest in Staff Development & Training

The changes in the information environment point to the need for continuous upgrading of skill sets at all levels of the organization. Without a well-structured learning and training environment, the library will not keep up with new information opportunities and will be less effective. Continuous learning is becoming part of the job of each person. The library has to plan and set up each job to include enough time and opportunity to upgrade skills. Good training programs also boost the confidence level of staff and enable effective execution of change.

Staff development in all areas of assessment is needed. This includes training on appropriate information analysis tools and software as well as continuous skills upgrading in assessment work. Many librarians feel that they lack the technical and computer skills needed, and resist acquiring those skills. Many feel that they lack the skills to use data gathering techniques such as surveys and focus groups. They also are unsure about using statistics. Professionals hesitate working in areas where they lack knowledge, as this seems to signify lack of control. Lack of skills also creates lack of confidence. Much assessment is not carried out because staff lacks the confidence to try out new and unfamiliar activities. The skills issue may also be aggravated by a lack of well-organized technical support for non-technical staff. Without this supportive environment, staff's capability to use assessment and analysis tools is derailed.

Develop External Links – Multi–agency Reporting System

Creating links to external agencies or consortia to enable consortia-based reporting.

Network Planning – Integrate into Institution's Plan

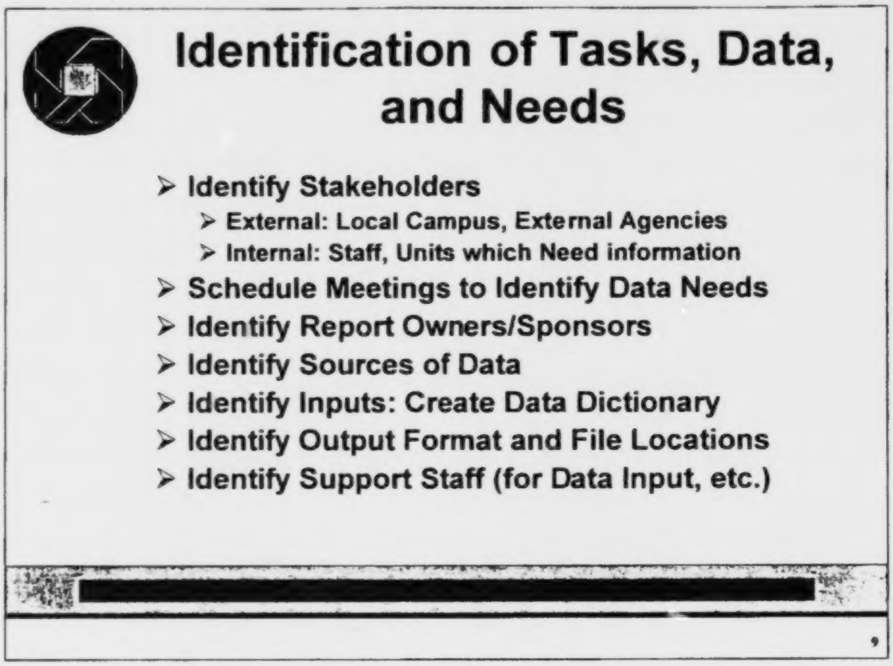
Plan to integrate the library's network into the parent institution's plan in order to facilitate creating and maintenance of data marts, the ability to link easily into the campus student system and financial system. This will also facilitate the creation of an integrated institutional portal, and may ease the analysis of learning outcomes.

Invest in (IT) Infrastructure

Look at IT infrastructure as a long term investment and not as cost. Invest from customer service perspective.

Merge New Network Related Measures with Other Assessment Metrics

Merge the E-Metrics measures with other traditional metrics to see more clearly service trends.



Identification of Tasks, Data, and Needs

- Identify Stakeholders
  - External: Local Campus, External Agencies
  - Internal: Staff, Units which Need information
- Schedule Meetings to Identify Data Needs
- Identify Report Owners/Sponsors
- Identify Sources of Data
- Identify Inputs: Create Data Dictionary
- Identify Output Format and File Locations
- Identify Support Staff (for Data Input, etc.)

Identification of Tasks, Data, and Needs

Identify Stakeholders

External: **Local Campus, External Agencies**

Identify campus units that provide or receive information, as well as external agencies (ARL).

Internal: **Staff, Units which Need information**

Identify functional, process-based, and structural units.

Identify individuals in each area.

Schedule Meetings to Identify Data Needs

Schedule interview with each unit that has data or needs information.

Identify Report Owners/Sponsors

Identify in each unit that will own the reports. Who will get the reports and what will they do with it?

Identify Sources of Data

Identify exactly where the data will come from (external vs. internal sources).

Identify Inputs: Create Data Dictionary

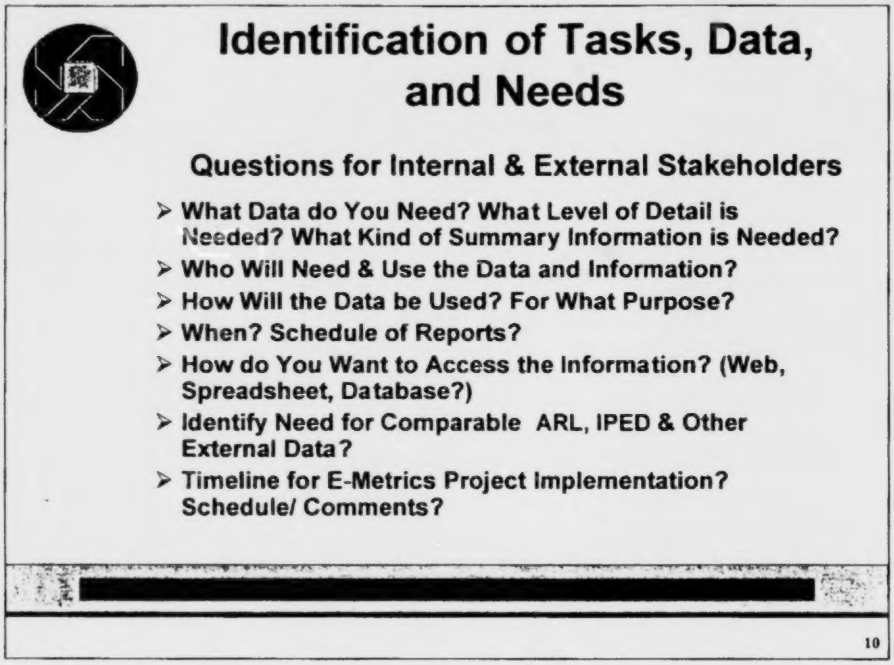
Create a data dictionary for type, source, format, archive, target location, etc.

Identify Output Format and File Locations

Create a list of outputs, their format and location.

Identify Support Staff (for Data Input, etc.)

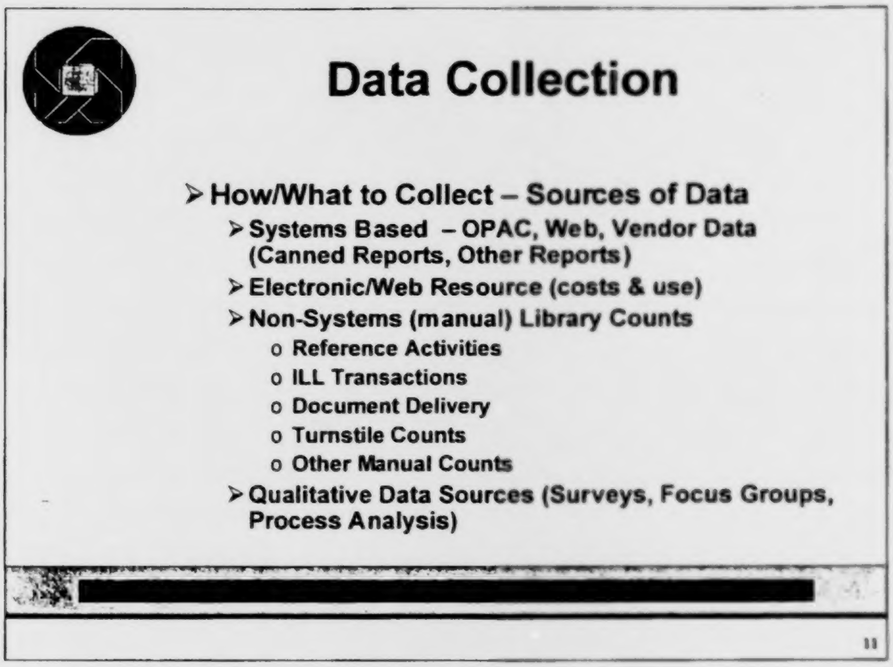
Identify staff who's role is to input data or create inputs into the system. Each unit or functional group should identify the staff with explicit responsibilities for data input, output, etc.



Identification of Tasks, Data, and Needs

Questions for Internal & External Stakeholders

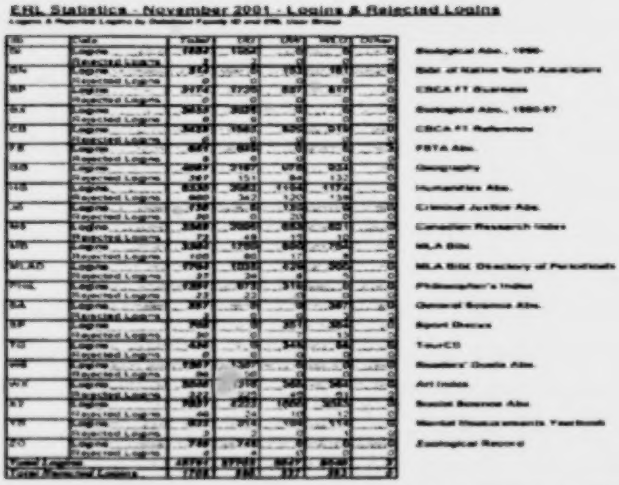
- What Data do You Need? What Level of Detail is Needed? What Kind of Summary Information is Needed?
- Who Will Need & Use the Data and Information?
- How Will the Data be Used? For What Purpose?
- When? Schedule of Reports?
- How do You Want to Access the Information? (Web, Spreadsheet, Database?)
- Identify Need for Comparable ARL, IPED & Other External Data?
- Timeline for E-Metrics Project Implementation? Schedule/ Comments?



Data Collection

- How/What to Collect – Sources of Data
  - Systems Based – OPAC, Web, Vendor Data (Canned Reports, Other Reports)
  - Electronic/Web Resource (costs & use)
  - Non-Systems (manual) Library Counts
    - Reference Activities
    - ILL Transactions
    - Document Delivery
    - Turnstile Counts
    - Other Manual Counts
  - Qualitative Data Sources (Surveys, Focus Groups, Process Analysis)

Data Examples

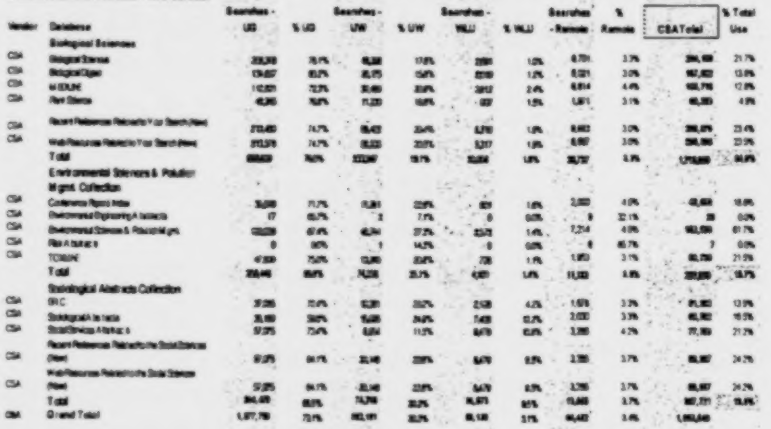


ERL Statistics - November 2001 - Logins & Rejected Logins

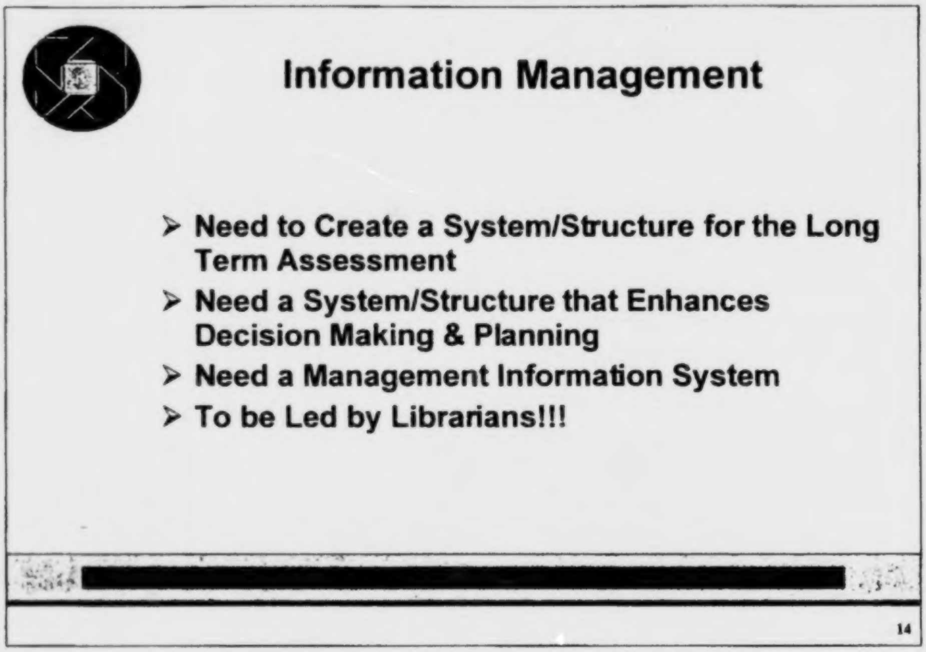
Source: TUG (**Tri-University Group of Libraries – University of Guelph, Wilfrid Laurier University & University of Waterloo) SilverPlatter ERL (Electronic Reference Library) Usage Statistics**

Data Examples

Example – Consortia CSA Database Use Data



Source: TUG (**Tri-University Group of Libraries - University of Guelph, Wilfrid Laurier University & University of Waterloo) CSA (Cambridge Scientific Abstracts) Usage Statistics**



Information Management

- Need to Create a System/Structure for the Long Term Assessment
- Need a System/Structure that Enhances Decision Making & Planning
- Need a Management Information System
- To be Led by Librarians!!!

Information Management

In order for the E-Metrics system to work long term, it is important to build a structured management system.

Need to Create a System/Structure for the Long Term Assessment

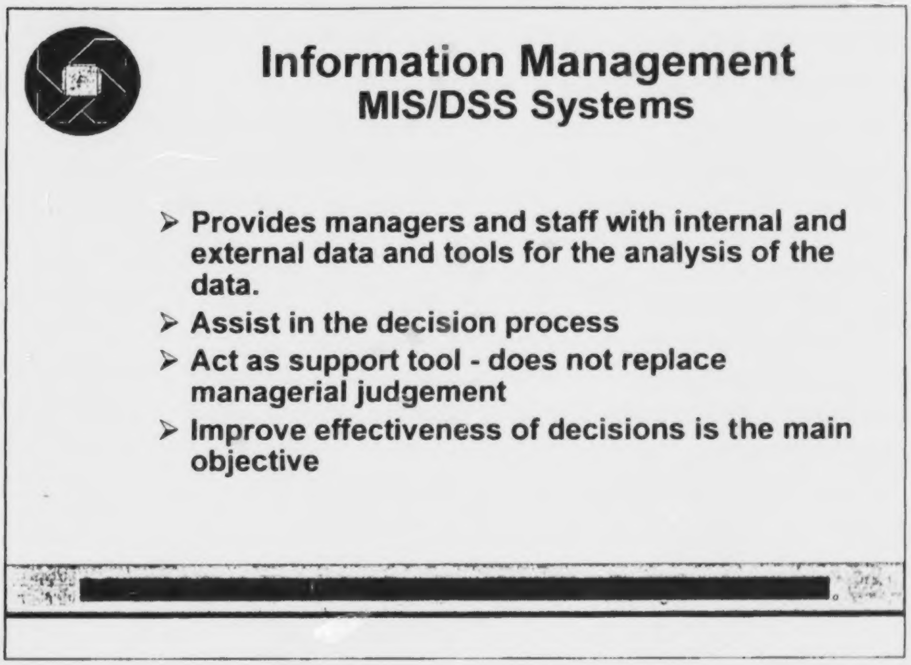
The system should be designed for the long term. This is not a short term project, but a system that needs to be ongoing. It needs to be viewed as a necessity for the library.It is needed for an environment that supports ongoing assessment.

Need a System/Structure that Enhances Decision Making & Planning

Systemic means that it is strategic and it is necessary for a planning environment and for ongoing decision making at all levels of the institution.

To be Led by Librarians!!!

This is not a system to be led or managed by systems staff, but by professional librarians. It should be led by librarians who care about customers, about analysis of data, about understanding the links and the relationships they find. Only librarians would do it justice.



Information Management
MIS/DSS Systems

- ➢ Provides managers and staff with internal and external data and tools for the analysis of the data.
- ➢ Assist in the decision process
- ➢ Act as support tool - does not replace managerial judgement
- ➢ Improve effectiveness of decisions is the main objective

MIS/DSS Systems

Management Information Systems are computer-based tools designed to improve management decisions. They have been around in industry and business since the 1950s. Concurrent with technological and management advances, refinements were added, and these systems evolved, some to be called Decision Support Systems (DSS) and later Executive Information Systems (EIS). The need for systematic application of Management Information Systems in libraries was recognized many years ago by Charles McClure and others (see attached select MIS bibliography). **However, systematic application of some kind of MIS in the library environment has been and remains rare.**

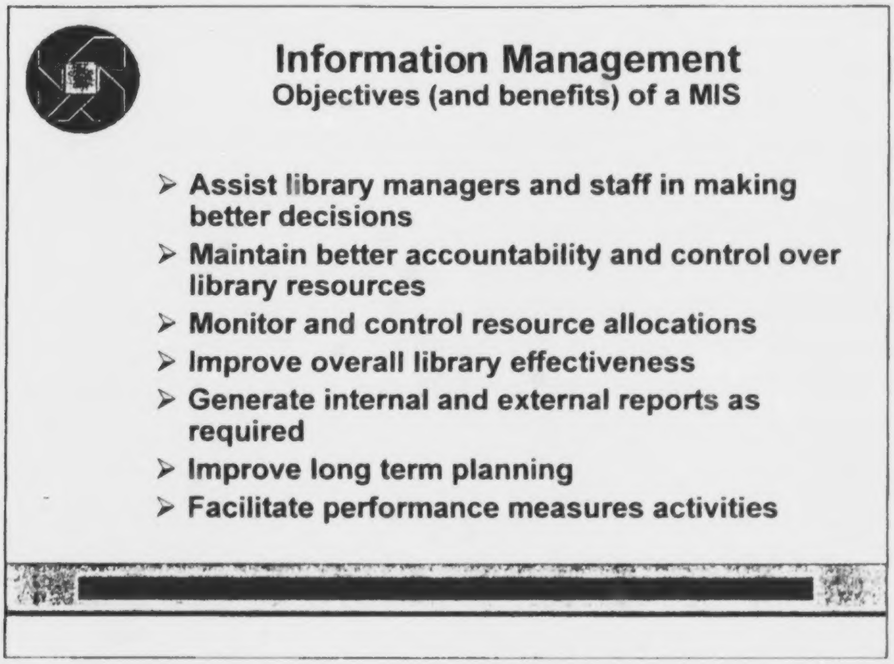
What are Management Information Systems? What do they do?

•**An MIS provides managers and staff with internal and external data and tools for the analysis of the data.** These are software-based systems or environments which use input measures, and with the right analysis tools, provide information to managers.

•**They assist in the decision process.**

•**They act as support tools.** They do not replace managerial judgement, they do not replace humans. They are helping tools.

•**Their main objective is to improve the effectiveness of decisions.** In other words, they are process improvement tools, information tools that help improve outcomes.



Information Management

Objectives (and benefits) of a MIS

- ➢ Assist library managers and staff in making better decisions
- ➢ Maintain better accountability and control over library resources
- ➢ Monitor and control resource allocations
- ➢ Improve overall library effectiveness
- ➢ Generate internal and external reports as required
- ➢ Improve long term planning
- ➢ Facilitate performance measures activities

Objectives (and Benefits) of an MIS.

In the library setting, what could be the objectives and eventual benefits of an MIS? A short list could be the following:

•First **assist managers and staff in their daily decision-making process**. With better information, decisions will be more effective.

•**Maintain better accountability and control on resources.** An MIS should give better real-time information for resource management, and allow for more assured accountability of the library.

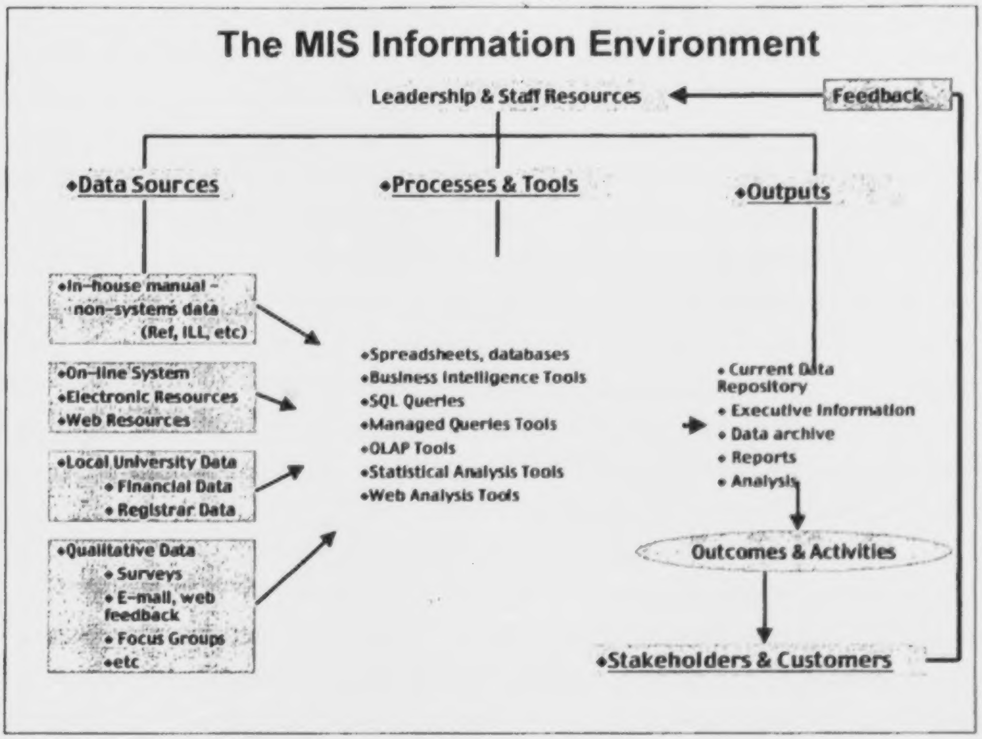
•**Monitor and control resource allocation.**s An equitable allocation of budgets, especially material budget allocations, is always a difficult exercise. A well-organized MIS may improve the process, both for reliable analysis and for the approval process.

•**Improve overall library effectiveness.** Paying attention to outcomes, to improved quality of work and service is important. Better analysis of client needs, better allocations of resources and services, better management decisions should improve effectiveness over time.

•**Generate internal and external reports.** We are required to produce large number of reports, both internally and to external agencies. Libraries invest large staff resources in collecting, organizing, filing, sending, and receiving these reports. An MIS should automate most of these activities and execute them efficiently. Hopefully these tools will also enhance comparison analysis between libraries.

•**Improve Long Term Planning.** An MIS should be incorporated into the planning process, or be the catalyst to enable planning where it is not present or not yet institutionalized.

•**Facilitate Performance Measures Activities.** Help with other qualitative performance measure activities by providing reliable information and tools.



The MIS Information Environment

Leadership & Staff Resources

Feedback

- **Data Sources**
  - In-house manual – non-systems data (Ref, ILL, etc)
  - On-line System
  - Electronic Resources
  - Web Resources
  - Local University Data
    - Financial Data
    - Registrar Data
  - Qualitative Data
    - Surveys
    - E-mail, web feedback
    - Focus Groups
  - etc
- **Processes & Tools**
  - Spreadsheets, databases
  - Business Intelligence Tools
  - SQL Queries
  - Managed Queries Tools
  - OLAP Tools
  - Statistical Analysis Tools
  - Web Analysis Tools
- **Outputs**
  - Current Data Repository
  - Executive Information
  - Data archive
  - Reports
  - Analysis

Outcomes & Activities

- Stakeholders & Customers

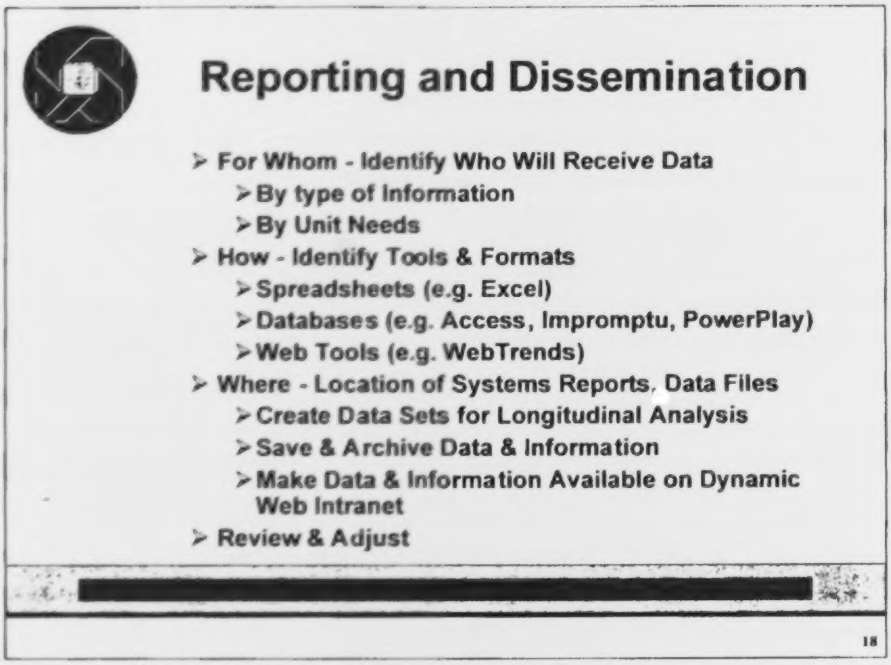
The MIS Environment

Data Sources – Input – from where we derive the data

Processes & Tools – how we manage our data & information and the tools we use to organize and analyze the information.

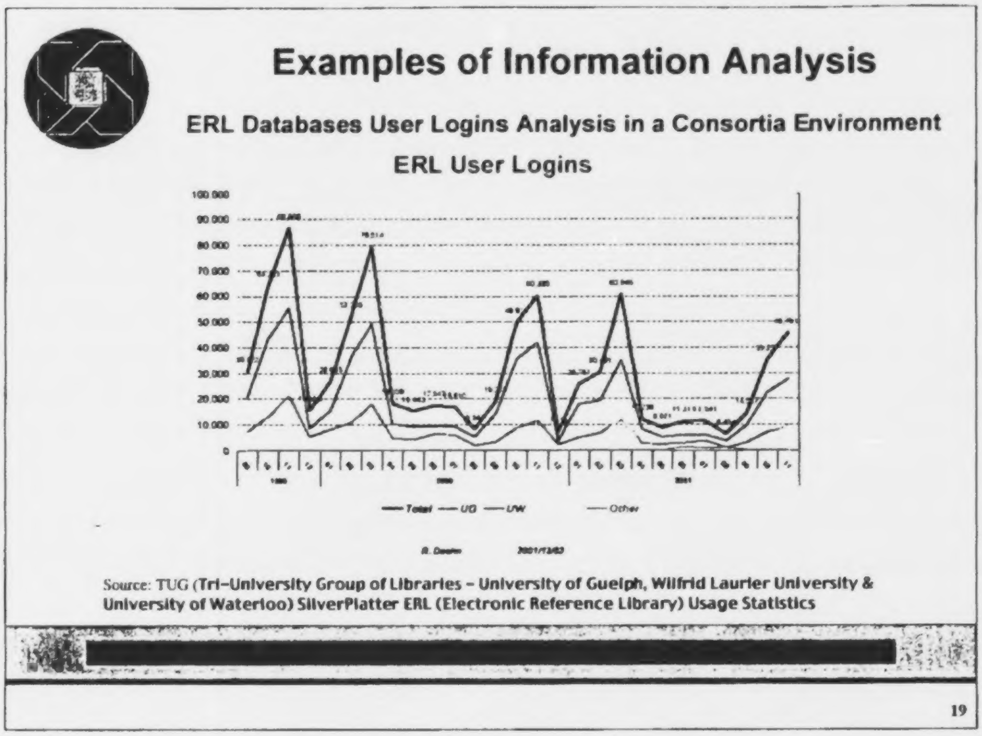
Outputs – How we manage, archive, create reports, do analysis – create an analysis and decision-making loop.

Feedback Loop – from our stakeholders and customers to library leaders and staff.



Reporting and Dissemination

- For Whom - Identify Who Will Receive Data
  - By type of Information
  - By Unit Needs
- How - Identify Tools & Formats
  - Spreadsheets (e.g. Excel)
  - Databases (e.g. Access, Impromptu, PowerPlay)
  - Web Tools (e.g. WebTrends)
- Where - Location of Systems Reports, Data Files
  - Create Data Sets for Longitudinal Analysis
  - Save & Archive Data & Information
  - Make Data & Information Available on Dynamic Web Intranet
- Review & Adjust



Examples of Information Analysis

ERL Databases User Logins Analysis in a Consortia Environment

ERL User Logins

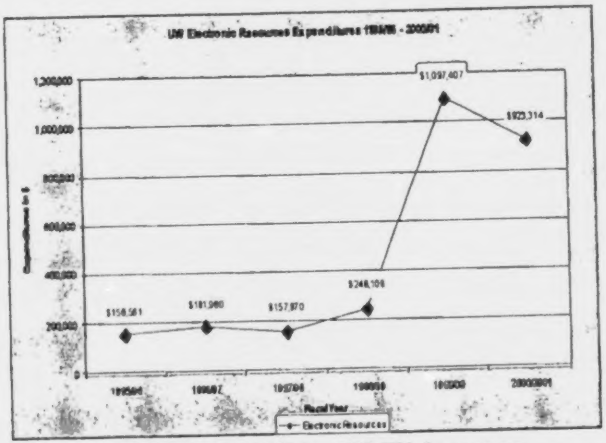
Source: TUG (**Tri-University Group of Libraries - University of Guelph, Wilfrid Laurier University & University of Waterloo) SilverPlatter ERL (Electronic Reference Library) Usage Statistics**

Example of ERL logins by TUG libraries over a specific time period.

Useful to analyze overall usage as well as to compare use by institutions.

Gives peak and low time picture.

Examples of Information Analysis

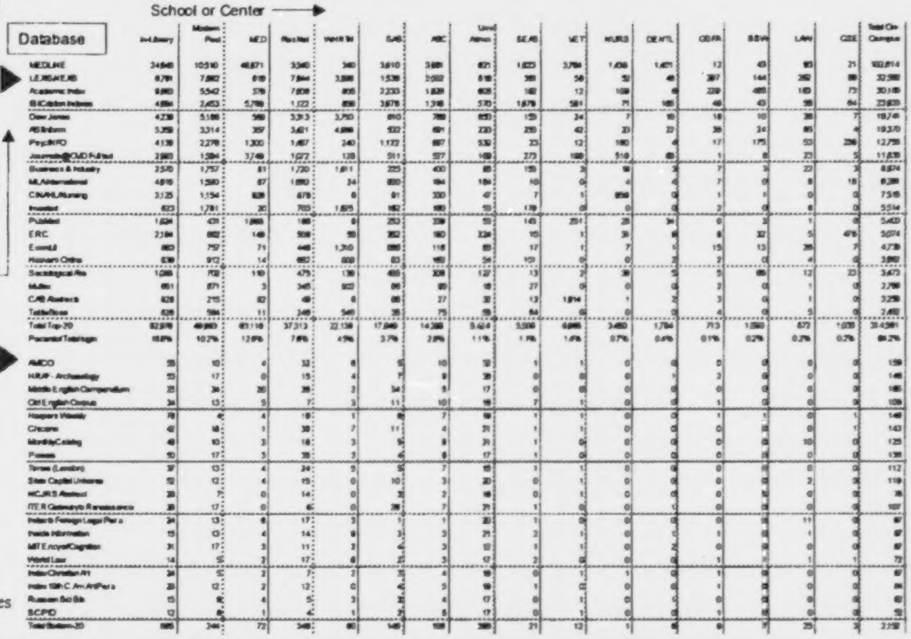


1995/96 – 2000/01 - 489.7% increase

Source: **University of Waterloo Acquisitions Expenditures Data**

Examples of Information Analysis

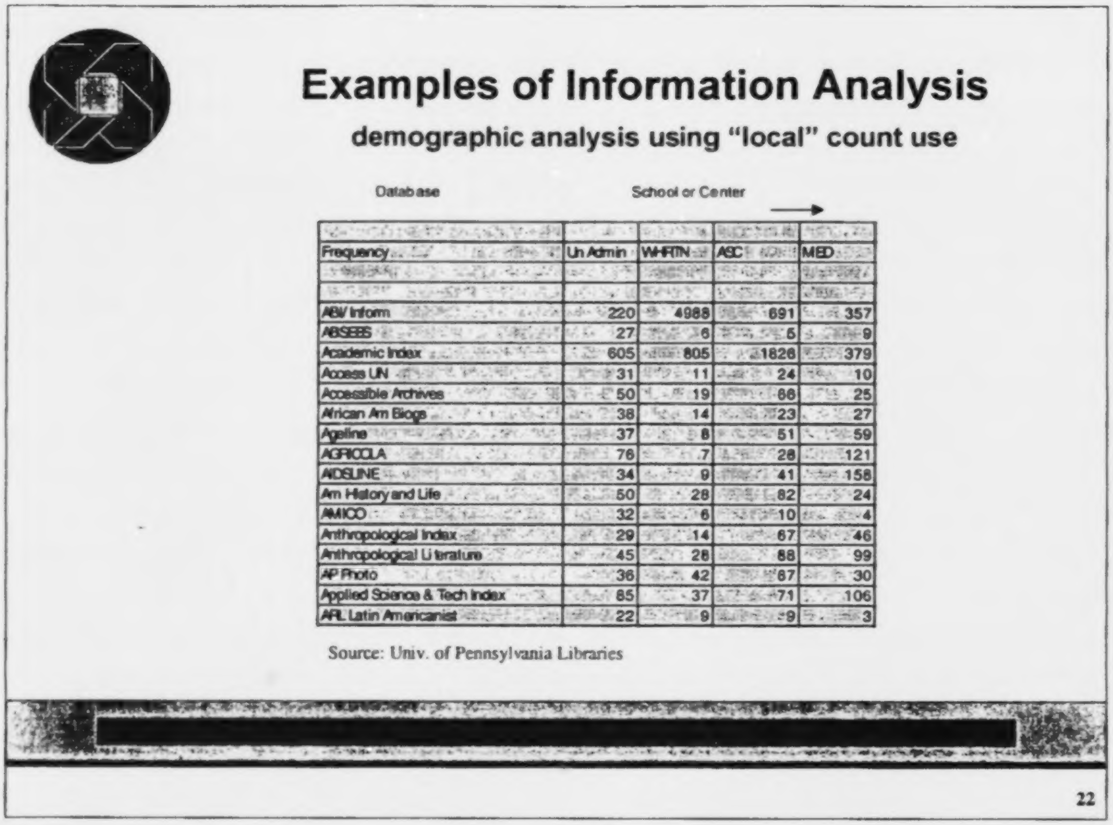
demographic analysis using "local" count use


School or Center
Database
MEDLINE
ERIC

The 20 more-used bases

The 20 less-used bases

Source: Univ. of Pennsylvania Libraries



Examples of Information Analysis

demographic analysis using "local" count use

Database

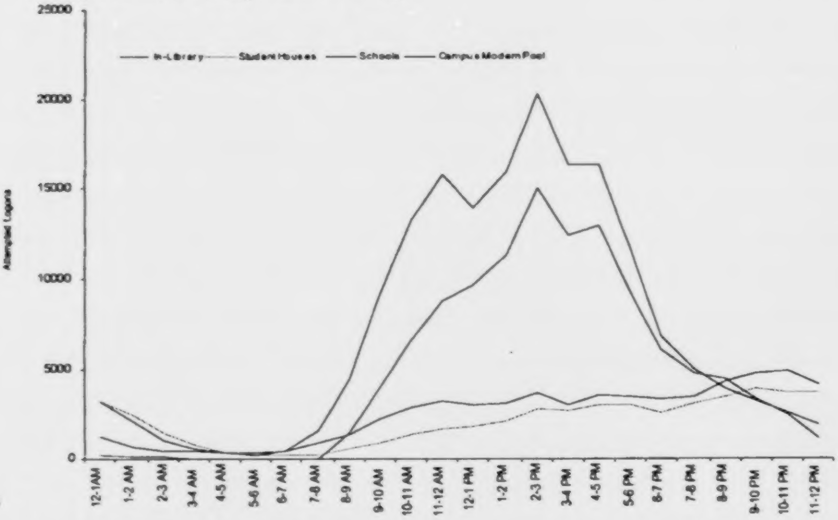
School or Center →

Frequency	Un Admin	WHRTN	ASC	MED
ABI/ Inform	220	4988	691	357
ABSEES	27	6	5	9
Academic Index	605	805	1826	379
Access UN	31	11	24	10
Accessible Archives	50	19	66	25
African Am Biogs	38	14	23	27
Ageline	37	8	51	59
AGRICOLA	76	7	28	121
AIDSLINE	34	9	41	158
Am History and Life	50	28	82	24
AMICO	32	6	10	4
Anthropological Index	29	14	67	46
Anthropological Literature	45	28	88	99
AP Photo	36	42	67	30
Applied Science & Tech Index	85	37	71	106
ARL Latin Americanist	22	9	9	3

Source: Univ. of Pennsylvania Libraries

Examples of Information Analysis

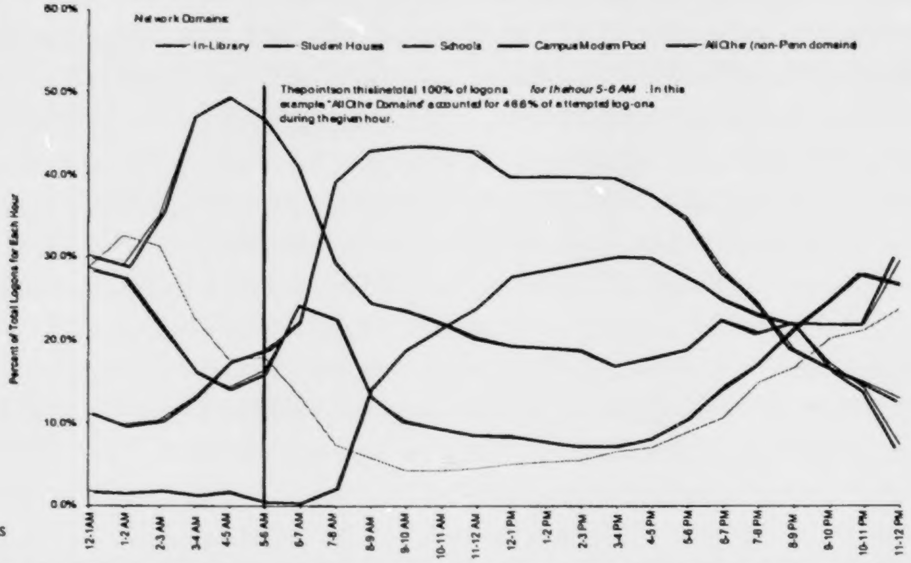
Analysis of use by hour of day



Source: Univ. of
Pennsylvania Libraries

Examples of Information Analysis

Analysis of use by domains within each hour.

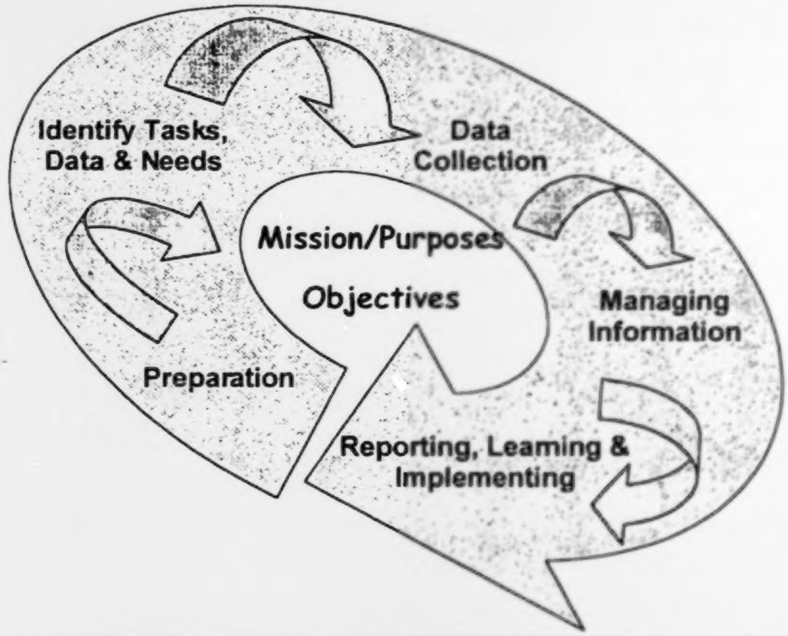


The points on this line total 100% of logons *for the hour 5-6 AM*. In this example "All Other Domains" accounted for 46.6% of attempted log-ons during the given hour.

Source: Univ. of
Pennsylvania Libraries

309

The E-Metrics Assessment Implementation Loop



Identify Tasks, Data & Needs

Data Collection

Mission/Purposes

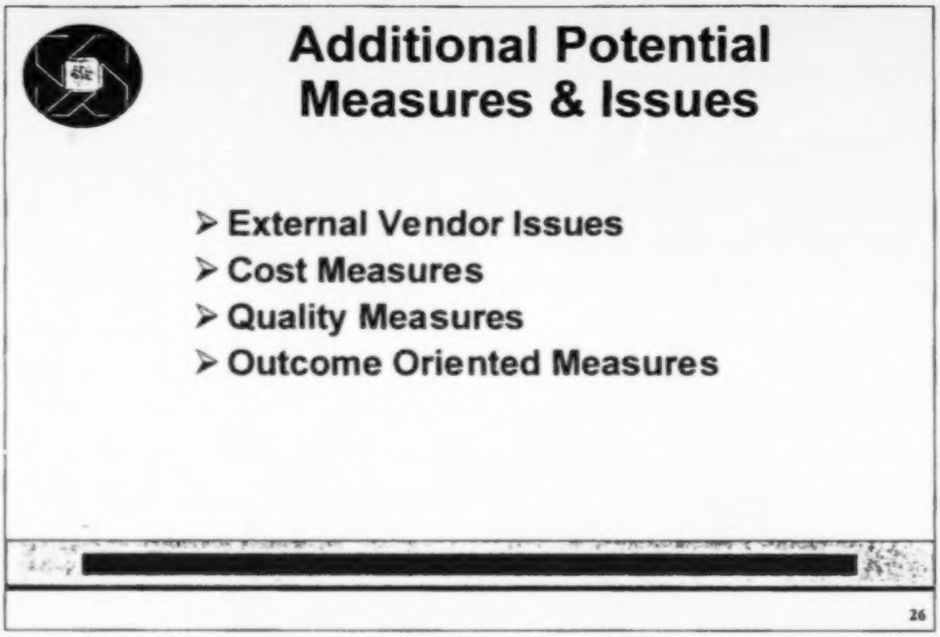
Objectives

Managing Information

Preparation

Reporting, Learning & Implementing

Close the Assessment Loop. Every implementation is a cycle that should come full circle. What you learn should be reapplied and the processes re-examined in view of the changes found.



Additional Potential Measures & Issues

- External Vendor Issues
- Cost Measures
- Quality Measures
- Outcome Oriented Measures

[redacted]

Additional Potential - Measures & Issues

External Vendor Issues

How to gather and compare information from many vendors

How to organize information from many vendors into one coherent report

How to control standards of reporting by external vendors or timing of reports

Cost Measures

How to understand costs over time

How to develop unit costs by local client

Quality Measures

How to identify value and give it a quantifiable measure understood by funders

Identify quality and develop assessment methodologies that are clear and understandable

Measures of reliability of service—breakdown of workstations, down time of system

Satisfaction measures—qualitative

Track online feedback over time

Outcome Oriented Measures

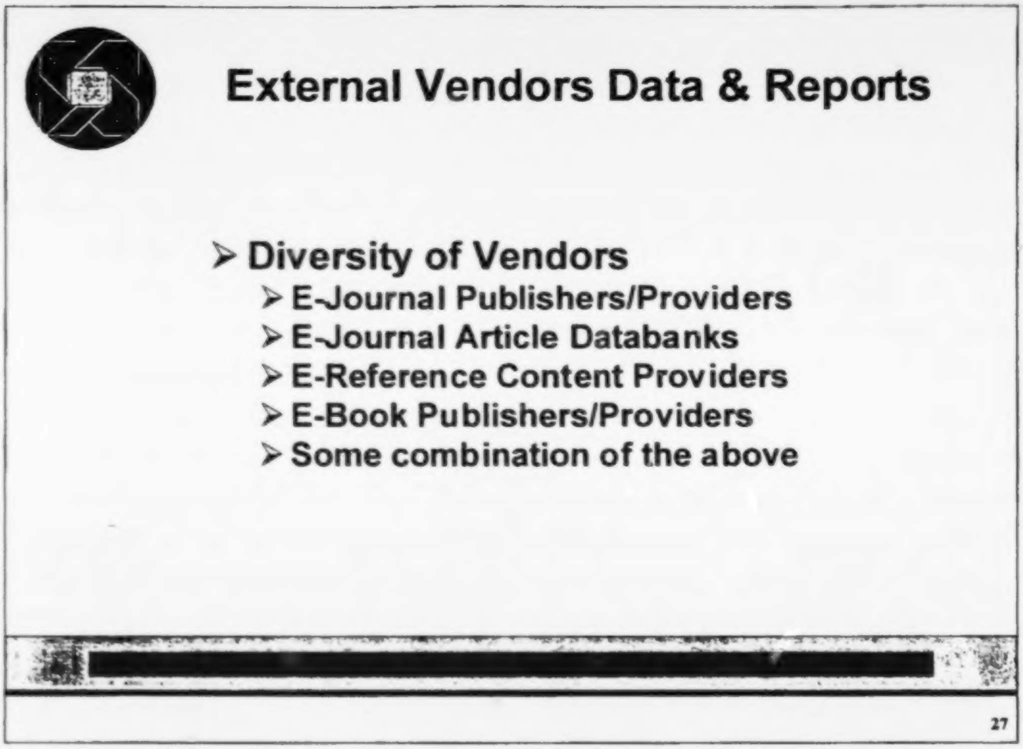
Measures of e-metrics should be decoupled from traditional library measures

We should be able to measure time saved by use of electronic resources

Unit cost of use over time

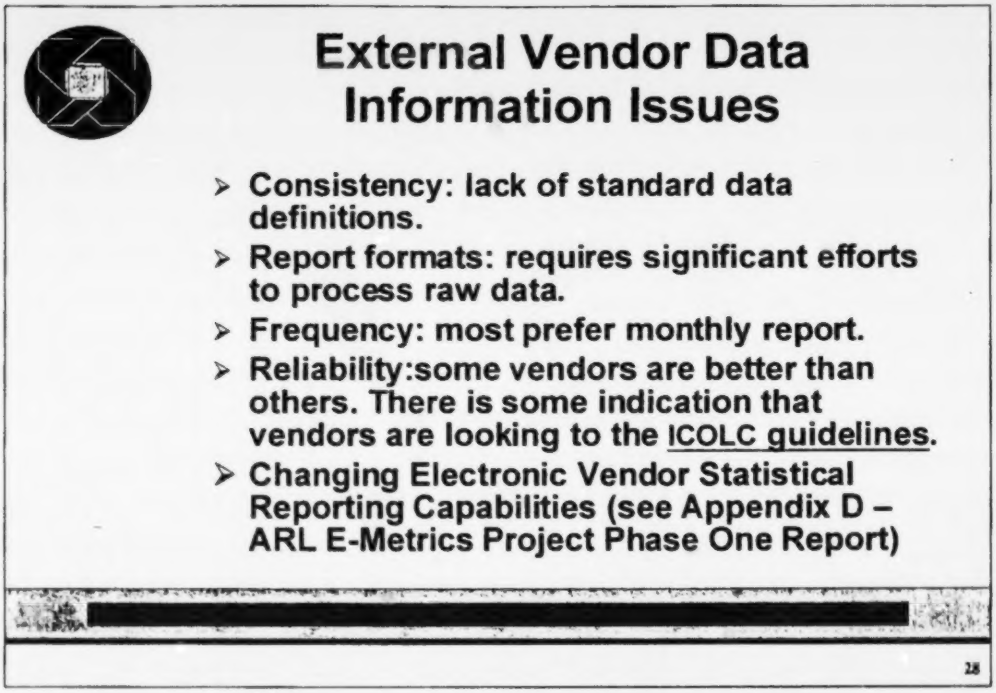
Possible better research outcomes by faculty and students

Development of methodologies to measure learning outcomes as related to availability of networked services



External Vendors Data & Reports

- Diversity of Vendors
  - E-Journal Publishers/Providers
  - E-Journal Article Databanks
  - E-Reference Content Providers
  - E-Book Publishers/Providers
  - Some combination of the above



External Vendor Data Information Issues

- Consistency: lack of standard data definitions.
- Report formats: requires significant efforts to process raw data.
- Frequency: most prefer monthly report.
- Reliability:some vendors are better than others. There is some indication that vendors are looking to the ICOLC guidelines.
- Changing Electronic Vendor Statistical Reporting Capabilities (see Appendix D – ARL E-Metrics Project Phase One Report)

28

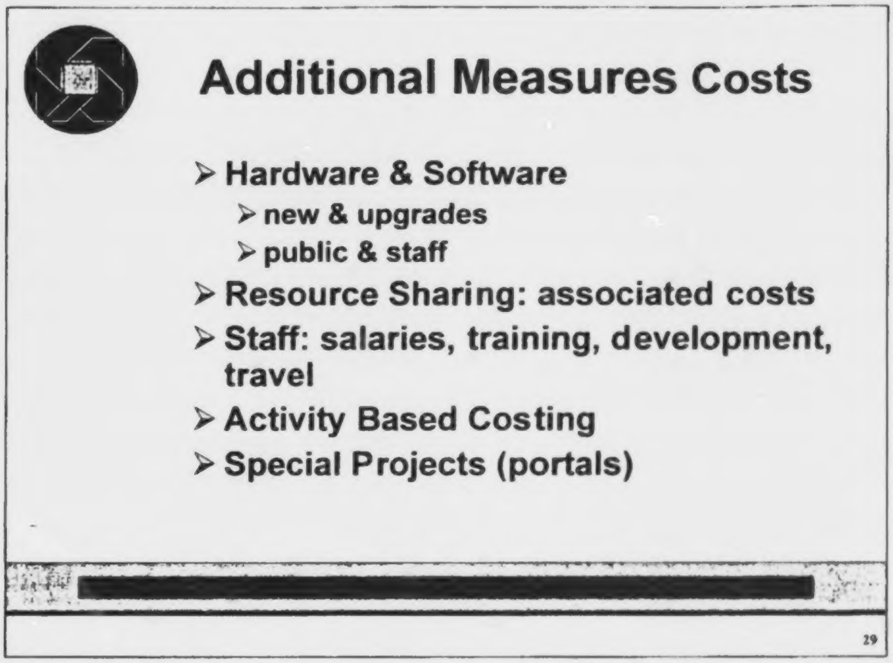
External Vendor Data Information Issues

Consistency - lack of standard data definitions.

Need for vendors to use standard data definitions in order for libraries to be able to create macro reports and be able to compare between use of resources and services from different vendors.

Report formats : requires significant efforts to process raw data.

It would be useful to develop standard reporting formats and easy ways to parse data into local resources for further analysis.



Additional Measures Costs

- Hardware & Software
  - new & upgrades
  - public & staff
- Resource Sharing: associated costs
- Staff: salaries, training, development, travel
- Activity Based Costing
- Special Projects (portals)

29

Additional Measures – Costs

Hardware & Software

new & upgrades

public & staff (ARL already counts?)

Resource Sharing – associated costs

Costs of ILL, Document Delivery, Staffing, Infrastructure, consortia fees, special arrangements..

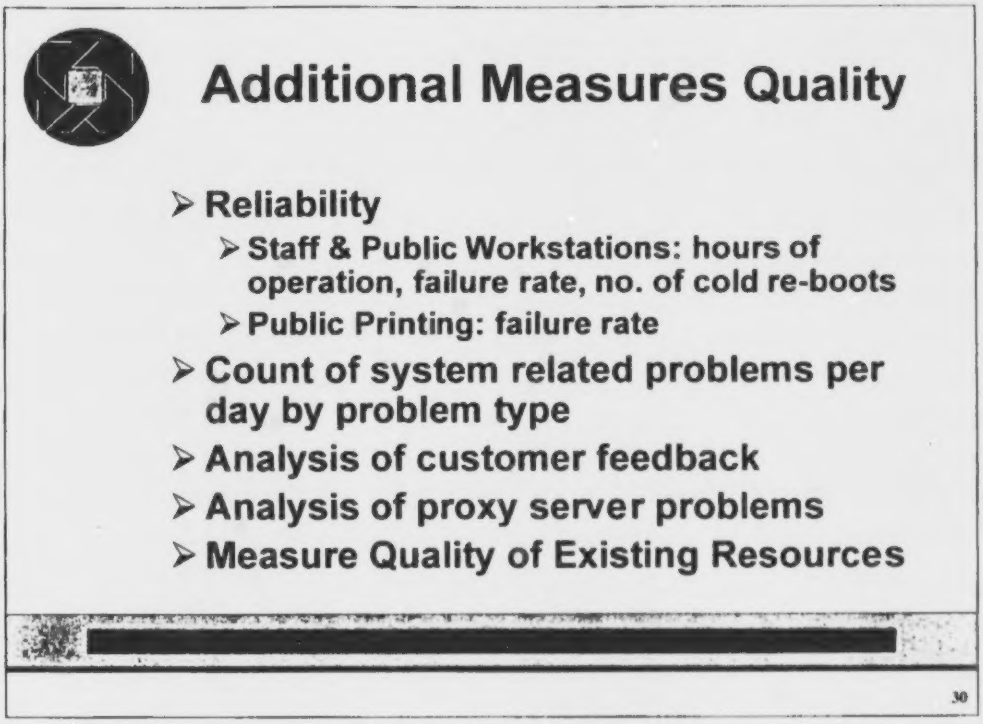
Staff – salaries, training, development, travel

Activity Based Costing

It may be useful to invest in ABC in order to get more realistic picture of costs, especially unit costs by function, service costs, and develop better ratios between resources and activities. There is a learning curve as not many institutions of higher education use ABC.

Special Projects (Portals)

Developing library, enterprise, or knowledge portals is expensive, not only from a staffing perspective, but also from a IT resource perspective. If, however, we see it as a long term investment in our services to our stakeholder and customers, if we see portals as a strategic necessity, we cannot avoid it. It is doable and it will change our life.



Additional Measures Quality

- Reliability
  - Staff & Public Workstations: hours of operation, failure rate, no. of cold re-boots
  - Public Printing: failure rate
- Count of system related problems per day by problem type
- Analysis of customer feedback
- Analysis of proxy server problems
- Measure Quality of Existing Resources

Additional Measures - Quality

Reliability

Staff & Public Workstations: hours of operation, failure rate, no. of cold re-boots

Public Printing: failure rate

Count of system related problems per day by problem type

To solve reliability of systems to customers, we need to make an extra effort to identify what customers want, what level of service they need, and where we fail.

Analysis of customer feedback

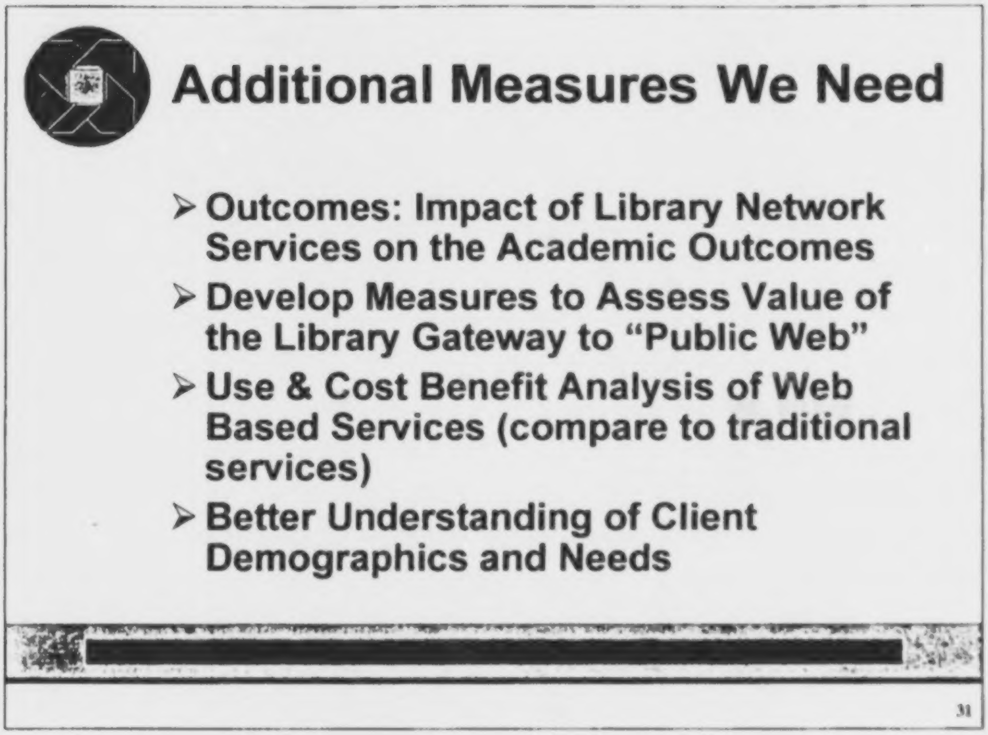
Have to analyze on an ongoing basis customer feedback and not see it as a nuisance, but an opportunity to identify problems, see what it takes to solve them and respond fast.

Analysis of proxy server problems

As many of our service problems relate to the proxy setups, find solutions that deal with these issues.

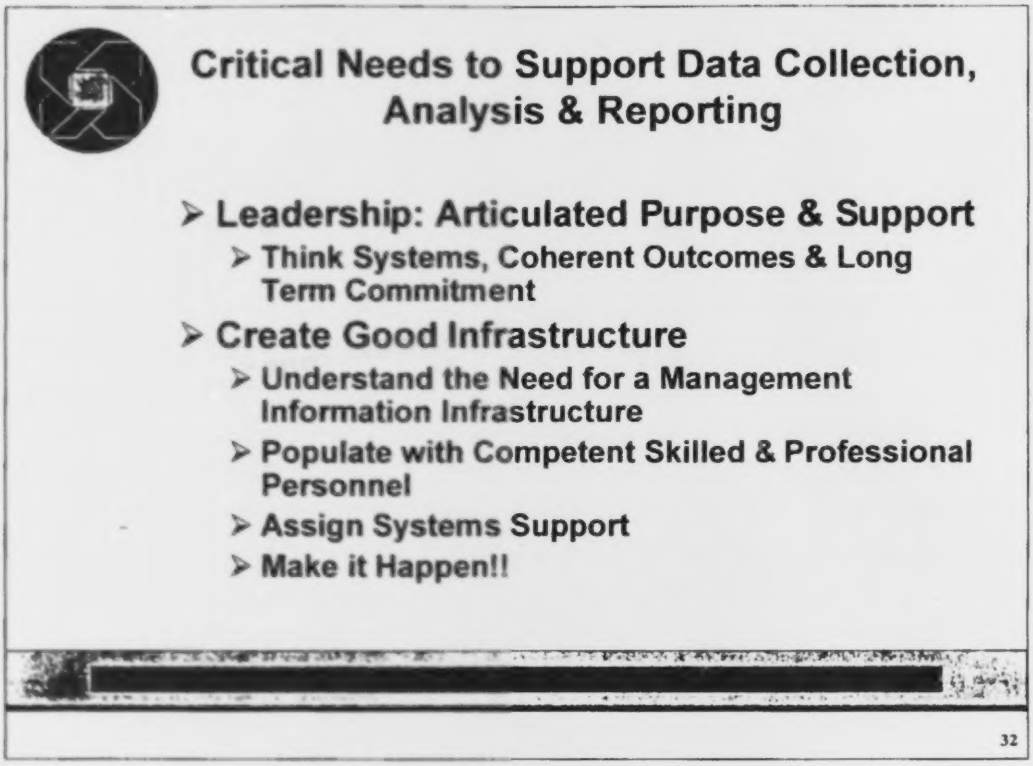
Measure Quality of Existing Resources

Assess quality of e-metrics resources by using customer feedback and benchmarking the services for service quality measures.



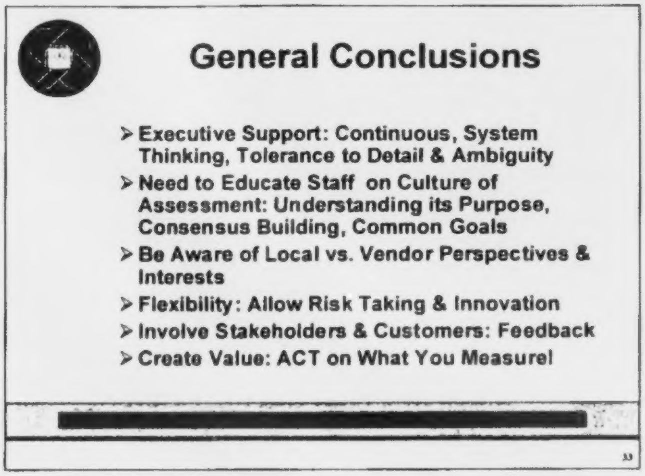
Additional Measures We Need

- Outcomes: Impact of Library Network Services on the Academic Outcomes
- Develop Measures to Assess Value of the Library Gateway to “Public Web”
- Use & Cost Benefit Analysis of Web Based Services (compare to traditional services)
- Better Understanding of Client Demographics and Needs



Critical Needs to Support Data Collection, Analysis & Reporting

- Leadership: Articulated Purpose & Support
  - Think Systems, Coherent Outcomes & Long Term Commitment
- Create Good Infrastructure
  - Understand the Need for a Management Information Infrastructure
  - Populate with Competent Skilled & Professional Personnel
  - Assign Systems Support
  - Make it Happen!!



General Conclusions

- ➢ Executive Support: Continuous, System Thinking, Tolerance to Detail & Ambiguity
- ➢ Need to Educate Staff on Culture of Assessment: Understanding its Purpose, Consensus Building, Common Goals
- ➢ Be Aware of Local vs. Vendor Perspectives & Interests
- ➢ Flexibility: Allow Risk Taking & Innovation
- ➢ Involve Stakeholders & Customers: Feedback
- ➢ Create Value: ACT on What You Measure!

General Conclusions

Executive Support: Continuous, System Thinking, Tolerance to Detail & Ambiguity

The leadership has to be inclusive, support learning, and create openness between people. A leadership steeped in culture of control will usually deliver either no change or will reinforce the status quo and the present power structure.

The leadership understands the purpose of creating a learning organization, it understands it and it believes in it and articulates it constantly to its staff, to organizational stakeholders, and to external customers. Needs to support openness and trust in the organization.

Need to Educate Staff on Culture of Assessment: Understanding its Purpose, Consensus Building, Common Goals

Staff have to be empowered for real change to take hold. Staff need a personal stake in the change. Only then will they embrace change. Change is resisted because it is "not familiar" and is viewed as imposed externally. In order for change to take root, leadership has to create organizational ownership.

Culture of assessment is an environment, a process that encourages learning. Ownership happens by doing and seeing results. As people learn how to do assessment, their confidence increases, they see results, they realize that they are the creators of the new environment, and eventually it spreads through the organization.

Be Aware of Local vs. Vendor Perspectives & Interests

Leaders and staff have to be cognizant of their articulated purpose and be educated about vendors and other publishers perspectives. This means that librarians have to continue to dialogue and be well informed about externals pressures in order to make good decisions.

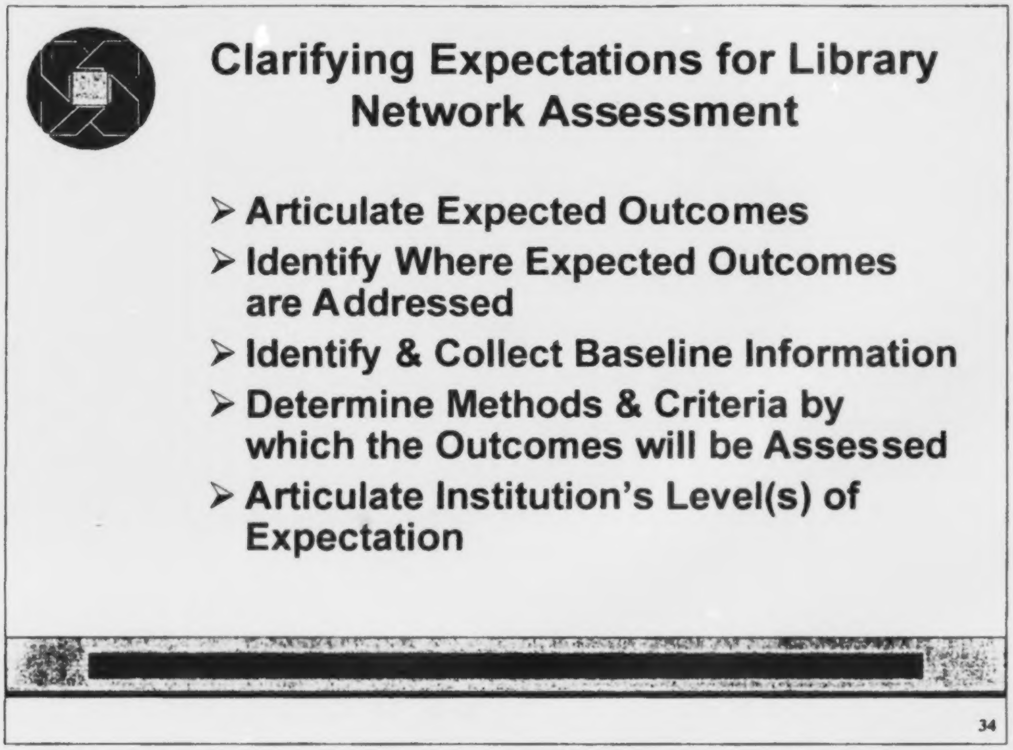
Flexibility: Allow Risk Taking & Innovation

Since assessment work may be new and unfamiliar, and viewed as risky, risk should be encouraged. In essence risk taking will have to be the norm in libraries. Without taking chances and experimenting with new ideas and services, we will fail. Staff should be encouraged to experiment and possibly fail. You learn much from mistakes.

Involve Stakeholders & Customers: Feedback

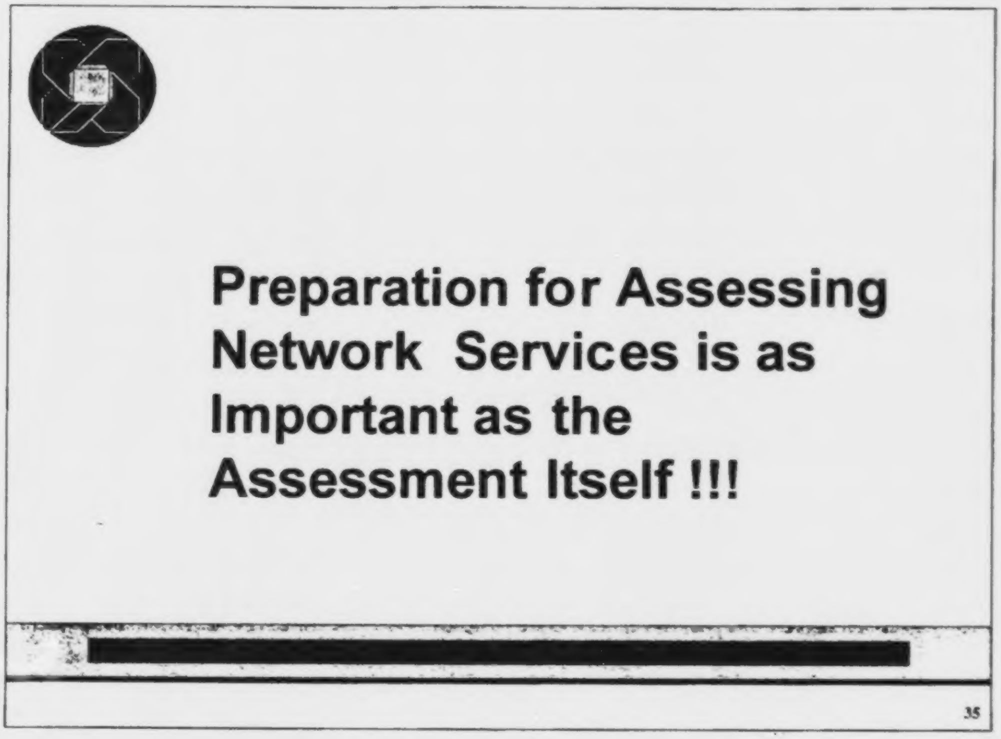
Continuous communication with customers is maintained through needs assessment, quality outcome, and satisfaction measurements. Relevant data and user feedback is routinely collected, analyzed, and used to set priorities, allocate resources, and make decisions. Create a learning environment that understands the need for the feedback loop with customers and appreciate the need for assessment as an everyday, reflective, systematic activity.

Create Value: ACT on What You Measure!



Clarifying Expectations for Library Network Assessment

- ➢ Articulate Expected Outcomes
- ➢ Identify Where Expected Outcomes are Addressed
- ➢ Identify & Collect Baseline Information
- ➢ Determine Methods & Criteria by which the Outcomes will be Assessed
- ➢ Articulate Institution's Level(s) of Expectation



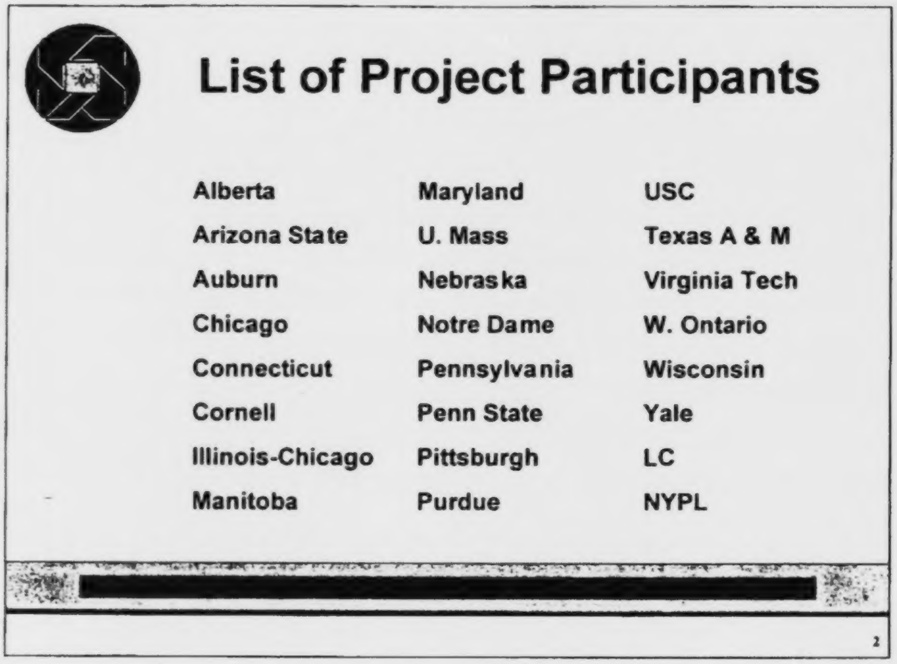
Preparation for Assessing Network Services is as Important as the Assessment Itself !!!

ARL New Measures Initiative

The E-Metrics Project

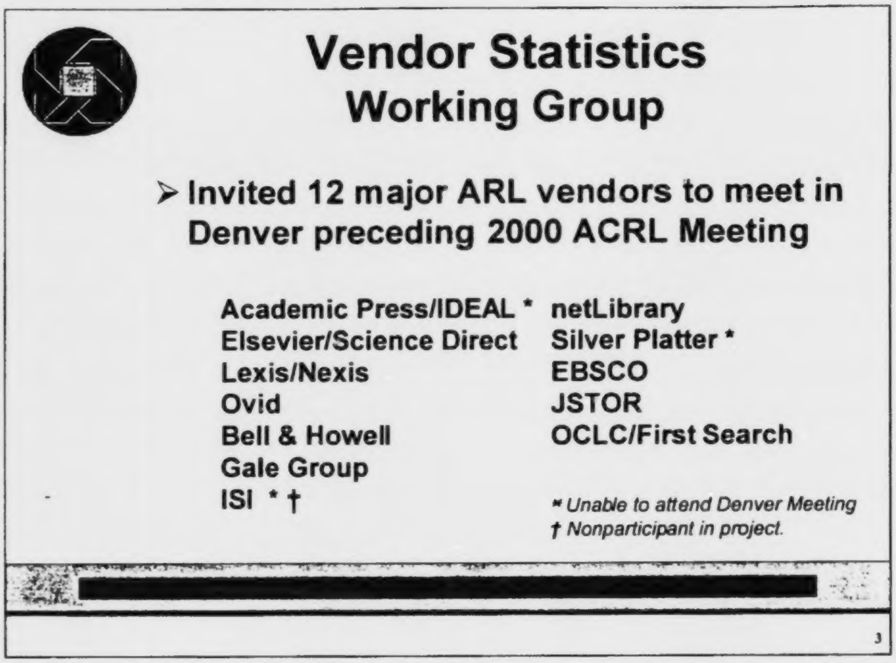
Recommended Statistics and Measures for Library Networked Services

ARL E-Metrics Phase II Report



List of Project Participants

- Alberta
- Arizona State
- Auburn
- Chicago
- Connecticut
- Cornell
- Illinois-Chicago
- Manitoba
- Maryland
- U. Mass
- Nebraska
- Notre Dame
- Pennsylvania
- Penn State
- Pittsburgh
- Purdue
- USC
- Texas A & M
- Virginia Tech
- W. Ontario
- Wisconsin
- Yale
- LC
- NYPL

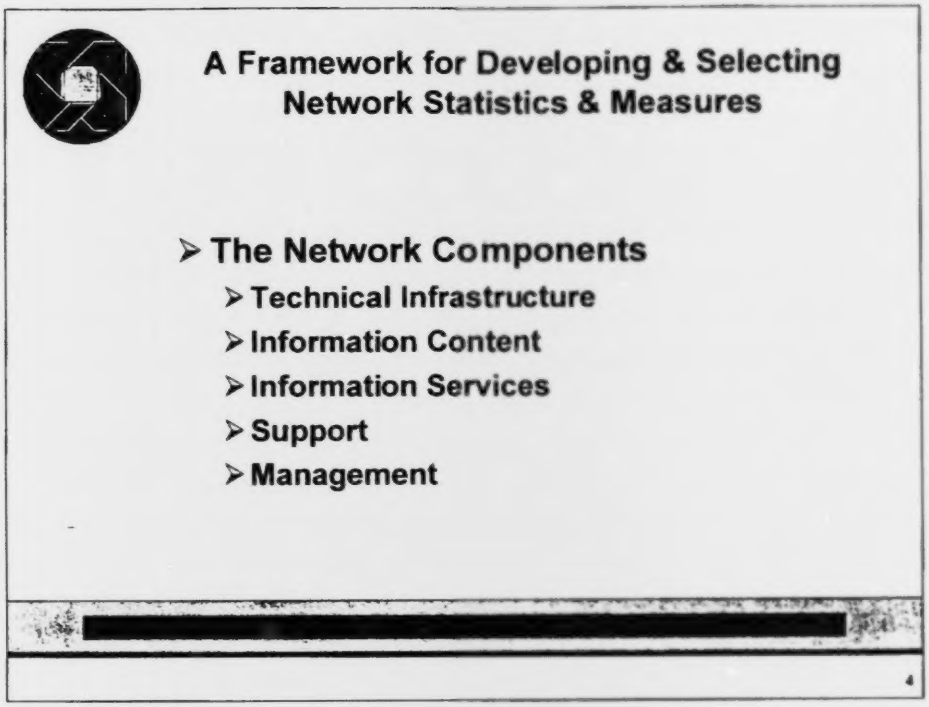


Vendor Statistics
Working Group

- Invited 12 major ARL vendors to meet in Denver preceding 2000 ACRL Meeting

Academic Press/IDEAL *	netLibrary
Elsevier/Science Direct	Silver Platter *
Lexis/Nexis	EBSCO
Ovid	JSTOR
Bell & Howell	OCLC/First Search
Gale Group	
ISI * †	

** Unable to attend Denver Meeting*
† Nonparticipant in project.



A Framework for Developing & Selecting Network Statistics & Measures

- ➢ The Network Components
  - ➢ Technical Infrastructure
  - ➢ Information Content
  - ➢ Information Services
  - ➢ Support
  - ➢ Management

The Network Component Perspective serves as a useful mechanism through which to select and measure specific aspects of a library's networked services and resources along a number of network aspects.

This perspective suggests that there are a number of measurable components to electronic networks:

•**Technical infrastructure:** The hardware, software, equipment, communication lines, and technical aspects of the network (e.g., workstations, modems, servers);

•**Information content:** The information resources available on the network (e.g., local government information, special collections, JSTOR, ScienceDirect);

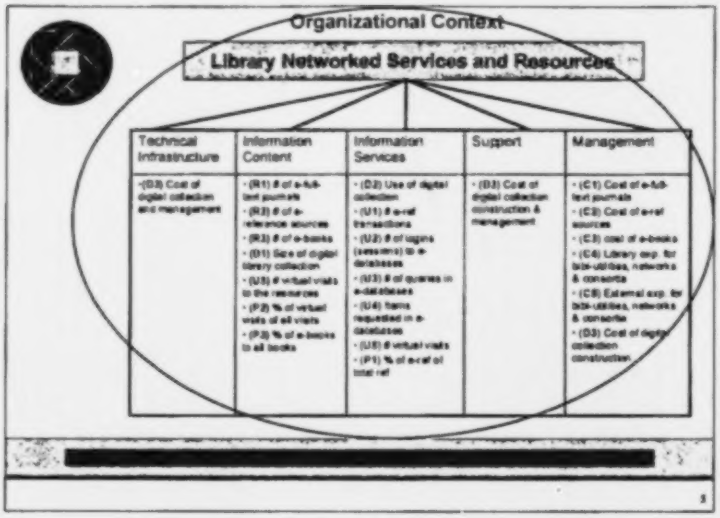
•**Information services:** The activities in which users can engage and the services that users may use to complete various tasks (e.g., online reference services, usage of digital information content);

•**Support:** The assistance and support services provided to help users better use the network (e.g., training, help desk);

•**Management:** The human resources, governance, planning, and fiscal aspects of the network (e.g., network staff, advisory boards, budgeting).

These network components provide a means through which to consider the type of statistics and performance measures that would enable research libraries to describe and evaluate their networked services and resources.

It is possible to look at the information content aspect of a network and consider network statistics and performance measures for that aspect of library networked services, thus enabling one to map the network statistics and performance measures as presented in Part 4 of this report.



Organizational Context

Library Networked Services and Resources

Technical Infrastructure	Information Content	Information Services	Support	Management
•(D3) Cost of digital collection and management	• (R1) # of e-full-text journals • (R2) # of e-reference sources • (R3) # of e-books • (D1) Size of digital library collection • (U5) # virtual visits to the resources • (P2) % of virtual visits of all visits • (P3) % of e-books to all books	• (D2) Use of digital collection • (U1) # e-ref transactions • (U2) # of logins (sessions) to e-databases • (U3) # of queries in e-databases • (U4) Items requested in e-databases • (U5) # virtual visits • (P1) % of e-ref of total ref	• (D3) Cost of digital collection construction & management	• (C1) Cost of e-full-text journals • (C2) Cost of e-ref sources • (C3) cost of e-books • (C4) Library exp. for bib-utilities, networks & consortia • (C5) External exp. for bib-utilities, networks & consortia • (D3) Cost of digital collection construction

[redacted]

The notations in parentheses here and in this slide and in Figure 1.1 in the text of the Phase II report refer to the statistics and measures presented in detail in Part 4 of this report.

•Technical Infrastructure

- •(D3) Cost of digital collection construction and management;

•Information Content

- •(D1) Size of digital library collection;
- •(P1) Percentage of electronic reference of total reference;
- •(P2) Percentage of virtual library visits of all library visits;
- •(P3) Percentage of electronic books to all books;
- •(R1) Number of electronic full-text journals;
- •(R2) Number of electronic reference sources;
- •(R3) Number of electronic books;
- •(U5) Number of virtual visits to the networked library resources;

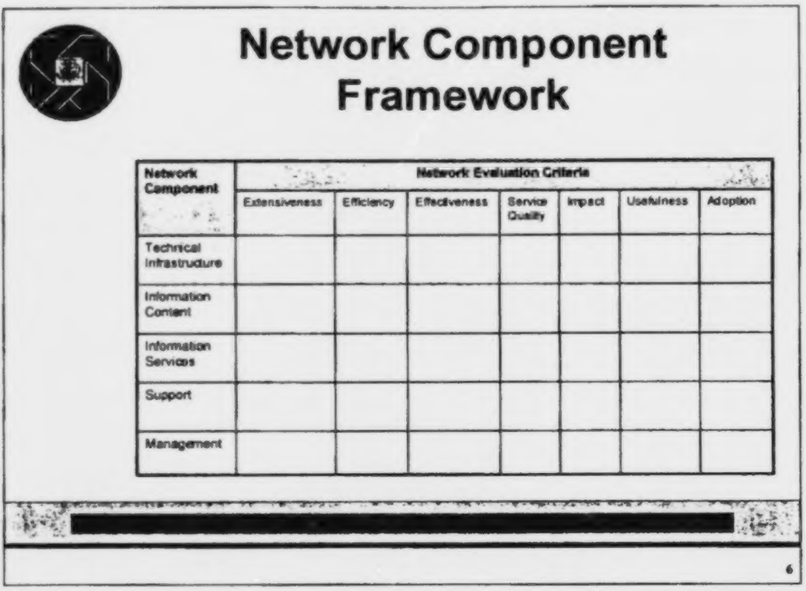
•Support

- • (D3) Cost of digital collection construction and management;

•Management

- •(C1) Cost of electronic full-text journals;
- •(C2) Cost of electronic reference sources;
- •(C3) Cost of electronic books;
- •(C4) Library expenditures for bibliographic utilities, networks, and consortia;
- •(C5) External expenditures for bibliographic utilities, networks, and consortia;
- •(D3) Cost of digital collection construction and management.

Using this approach, libraries can gain a sense of the use and uses, management, and reach of their networked services and resources in specific areas or across a number of areas. In addition, libraries can look in-depth at particular aspects of their networked services and resources. Moreover, by selecting statistics and performance measures relevant and of interest to library staff and managers required for reporting purposes, or other motivational factors, it is possible for libraries to develop an overall sense of their networked services and resources along a network dimension. The Network Component Perspective also serves as a framework for the development of additional network statistics and measures not field-tested during this project.



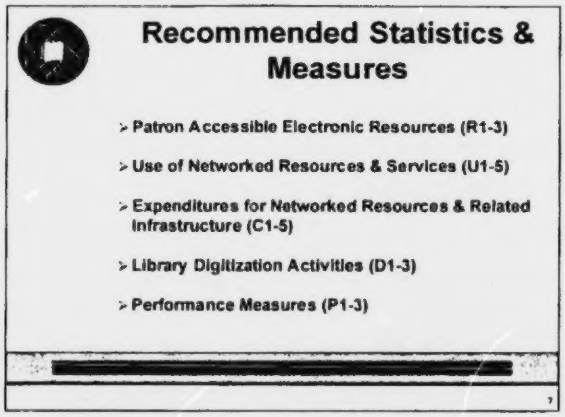
Network Component Framework

Network Component	Network Evaluation Criteria					
	Extensiveness	Efficiency	Effectiveness	Service Quality	Impact	Usefulness	Adoption
Technical Infrastructure							
Information Content							
Information Services							
Support							
Management							

Conceptualization of these components will depend on the particular circumstances of the individual library. The Network Component Model (Bertot and McClure, 1998) serves as a framework for such a conceptualization (see Figure 1.2):

- *Extensiveness*: How much service the library provides (e.g., number of users accessing a Web page per week, number of database sessions);
- *Efficiency*: The use of resources in providing or accessing networked information services (e.g., cost per session in providing access to remote users of an online database, average number of times users are unable to successfully connect to the library's servers);
- *Effectiveness*: How well the networked information service meets the objectives of the provider or the user (e.g., success rate of identifying and accessing the information needed by the user);
- *Service quality*: How well a service or activity is done (e.g., percentage of transactions in which users acquire the information they need);
- *Impact*: How a service made a difference in some other activity or situation (e.g., the degree to which network users enhanced their ability to gain employment or pursue business);
- *Usefulness*: The degree to which the services are useful or appropriate for individual users (e.g., percentage of services of interest to different types of user audiences);
- *Adoption*: The extent to which institutions or users integrate and adopt electronic networked resources or services into organizational or individual activities (e.g., answering reference questions, generating interlibrary loan requests, use of digital collections).

It may not be necessary to develop measures that address every evaluation criteria for every network component. Instead, the matrix serves as an organizational tool for evaluating possible measures that an individual library will need to assess its outcomes of interest. These types of criteria provide an important roadmap for thinking about the type of data element and statistics that would be necessary to produce such measures, as well as providing a quality measurement framework for library networked services and resources.



Recommended Statistics & Measures

- > Patron Accessible Electronic Resources (R1-3)
- > Use of Networked Resources & Services (U1-5)
- > Expenditures for Networked Resources & Related Infrastructure (C1-5)
- > Library Digitization Activities (D1-3)
- > Performance Measures (P1-3)

7

This section provides definitions, data collection procedures, and discusses related issues pertaining to interpreting and using the recommended statistics and measures. The definitions and procedures were derived from a month of field-testing at more than a dozen ARL libraries. The statistics and performance measures represent a minimum set of data that need to be collected continually and used. Individual libraries will need to develop local procedures to support data collection activities within the guidelines of this manual. However, readers need to recognize that the statistics and measures will be refined and extended continuously in the future.

4.1 Recommended Statistics and Measures

Table 4.1 Network Statistics

Patron Accessible Electronic Resources

R1	Number of electronic full-text journals
R2	Number of electronic reference sources
R3	Number of electronic books

Use of Networked Resources and Services

U1	Number of electronic reference transactions
U2	Number of logins (sessions) to electronic databases
U3	Number of queries (searches) in electronic databases
U4	Items requested in electronic databases
U5	Virtual visits to library's Web site and catalog

Expenditures for Networked Resources and Related Infrastructure

C1	Cost of electronic full-text journals
C2	Cost of electronic reference sources
C3	Cost of electronic books
C4	Library expenditures for bibliographic utilities, networks, and consortia
C5	External expenditures for bibliographic utilities, networks, and consortia

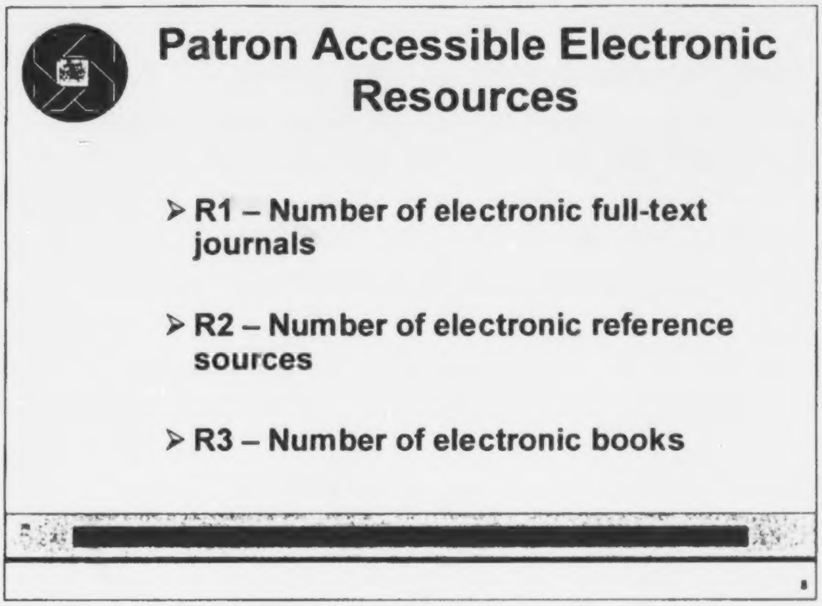
Library Digitization Activities

D1	Size of library digital collection
D2	Use of library digital collection
D3	Cost of digital collection construction and management

Table 4.2 Performance Measures

Performance Measures

P1	Percentage of electronic reference transactions of total reference
P2	Percentage of virtual library visits of all library visits
P3	Percentage of electronic books to all monographs



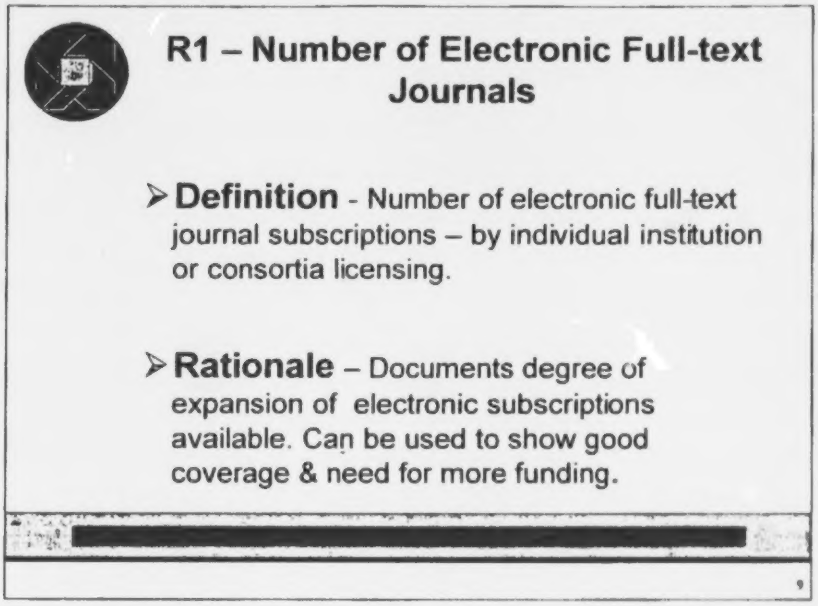
Patron Accessible Electronic Resources

- R1 – Number of electronic full-text journals
- R2 – Number of electronic reference sources
- R3 – Number of electronic books

4.3.1 Statistics Related to Patron Accessible Resources

The developed statistics for patron accessible resources account for networked resources and services. The current ARL membership criteria index lacks separate measures for electronic and networked monographs, serials, and bibliographic utilities. Though these electronic and networked resources may limit the amount of print materials acquired and may cost more than their print counterparts, they do constitute more widely available resources.

In the electronic and networked realm, the more a library has, the more materials are provided to customers anytime and anywhere. Although local needs and available resource allocations may differ from library to library, the resource statistics allow academic research libraries to see and to demonstrate to others the changing nature of library collections over the years. In turn, the libraries are expected to use them to make decisions about resource allocations (budget, staff, time, etc.) and to undertake strategic planning accordingly. Furthermore, the picture of available resources provides libraries with an opportunity to offer valued services. However, because the evolving nature of these statistics will rely heavily on technological enhancements, all libraries are encouraged to use extra caution while serving their institutional goals, missions, and visions.



R1 – Number of Electronic Full-text Journals

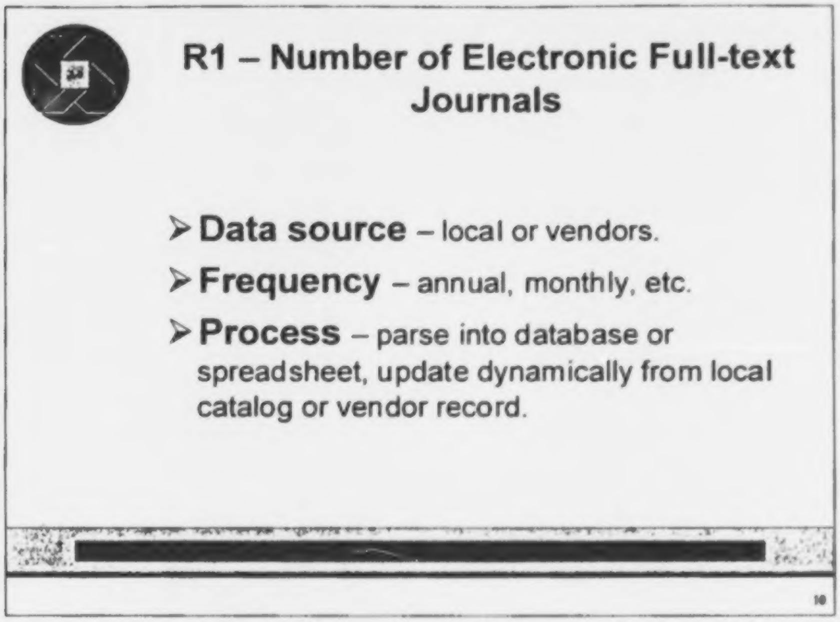
- **Definition** - Number of electronic full-text journal subscriptions – by individual institution or consortia licensing.
- **Rationale** – Documents degree of expansion of electronic subscriptions available. Can be used to show good coverage & need for more funding.

Definition: Number of electronic full-text journal subscriptions that the library provides to users either through an individual institutional licensing contract with the provider of journals or through other arrangements (e.g., regional or state consortium) for which the library pays a reduced or no fee for access. The full-text journals should provide both search and browse capabilities by title and issue. This is different from journal article databases, such as Expanded Academic ASAP in INFOTRAC, that do not provide browsing capability.

This includes electronic full-text journals offered by established scholarly journal publishing houses (e.g., Elsevier's ScienceDirect and Academic Press's IDEAL), scholarly societies (e.g., American Chemical Society journals and American Institute of Physics Online), and services which aggregate content from smaller publishers or from those publishers that prefer to use an external delivery platform (Highwire, OCLC ECO, and EbscoOnline). This should exclude general-purpose periodicals such as magazines and newspapers.

Rationale: Electronic access has expanded dramatically to provide a range of useful resources for library users. This statistic helps document the degree of expansion of electronic resource availability in the individual library and can be used to justify continuation and enhancement of these services.

Research libraries act increasingly as gateways to a vast array of external information. This measure specifically addresses the extensiveness of scholarly content a library provides to its user community. In many cases, electronic access enables the library to offer larger selections of journals than it could provide in paper format. This statistic can also be used for library promotion and internal and external reporting. Particularly, this statistic aims at showing the changing nature of traditional scholarly resources with improved and better access anytime and anywhere.



R1 – Number of Electronic Full-text Journals

- **Data source** – local or vendors.
- **Frequency** – annual, monthly, etc.
- **Process** – parse into database or spreadsheet, update dynamically from local catalog or vendor record.

Implementation

Collected by: Local and vendors

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

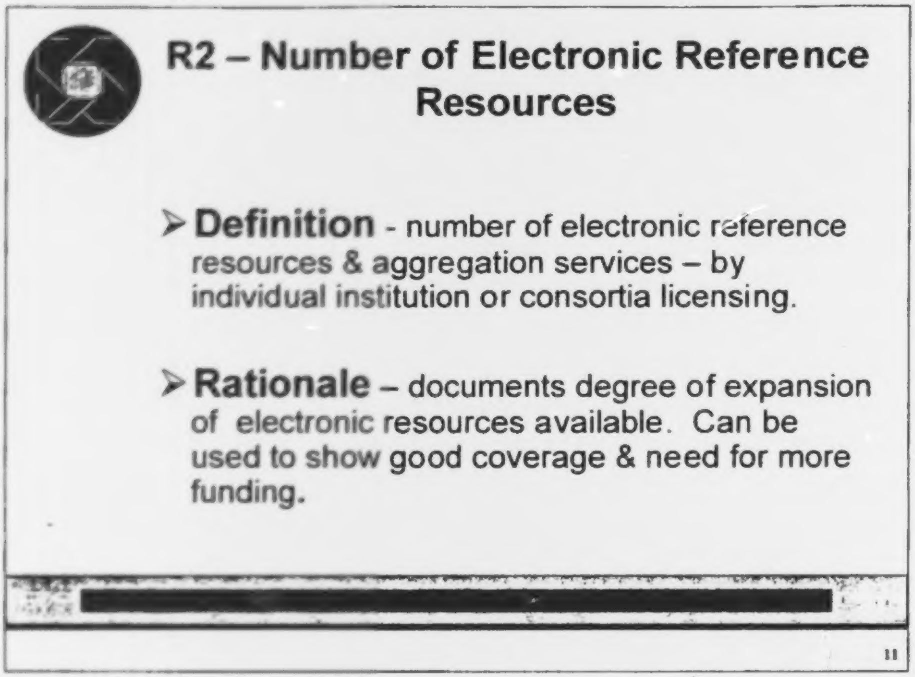
Procedures: It is impossible to obtain the complete list of electronic full-text journals from a single source. Possible sources for the information include library catalog records (those records that point to Web addresses), library Web pages that list the journal titles, the internal electronic resource management database, and vendor records (Web sites and contract documentation).

- Create a master list of full-text electronic journals from all the sources available. Use a spreadsheet or database program to organize and maintain the list.
- Remove titles that do not meet the above-mentioned definition but keep duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
- Record the counts and be sure they are updated regularly. The library should also update the count information on the library Web site and/or in marketing brochures on a regular basis.

Special considerations: It is time-consuming to establish procedures to collect this statistic for the first time. However, once that is done, it will be relatively easy to update the information. (This applies to other statistics and measures included in the manual as well.)

Include journal titles that come with print subscriptions or print plus online subscriptions since the focus of the statistic has to do with how many scholarly electronic journal titles users can access. Do not include free government publications and free electronic journals to which the library provides links.

Free government publications and free electronic journals are a valuable resource for many libraries. How to collect statistics relating to these resources will be addressed in the future.



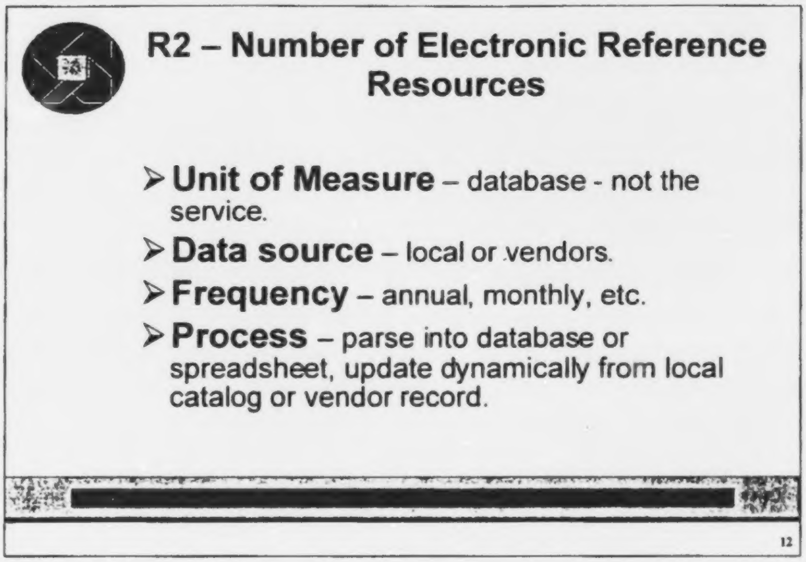
R2 – Number of Electronic Reference Resources

- **Definition** - number of electronic reference resources & aggregation services – by individual institution or consortia licensing.
- **Rationale** – documents degree of expansion of electronic resources available. Can be used to show good coverage & need for more funding.

Definition - This includes citation indexes and abstracts; full-text reference sources (e.g. encyclopedias, almanacs, biographical and statistical sources, and other quick fact-finding sources); full-text journal and periodical article collection services (e.g., EBSCOhost, ProQuest, Academic Universe, and INFOTRAC OneFile); dissertation and conference proceedings databases; and general-purpose magazines and newspapers. Licensed electronic resources also include those databases that institutions mount locally.

Rationale: Networking technology in libraries has improved and increased dramatically user access to a range of useful reference resources. This statistic documents the degree of expansion of electronic resource availability and can be used to justify continuation and enhancement of these services. In the 1990s, because of the increasing popularity of the Internet, the ways reference interviews were held and reference sources were used changed. Today, users have electronic formats as well as traditional reference sources to provide answers to their reference questions.

Research libraries traditionally act as gateways to a vast array of external information. This measure deals with the extensiveness of scholarly content the library provides to the user community and the availability of reference sources on an anytime/anywhere basis. In many cases, electronic access enables the library to offer more resources than it could in paper format. This statistic can also be used for library promotion and internal and external reporting. Specifically, this statistic aims at showing the changing nature of traditional scholarly resources with improved access.



R2 – Number of Electronic Reference Resources

- ➢ **Unit of Measure** – database - not the service.
- ➢ **Data source** – local or vendors.
- ➢ **Frequency** – annual, monthly, etc.
- ➢ **Process** – parse into database or spreadsheet, update dynamically from local catalog or vendor record.

Implementation

Collected by: Local and vendors

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

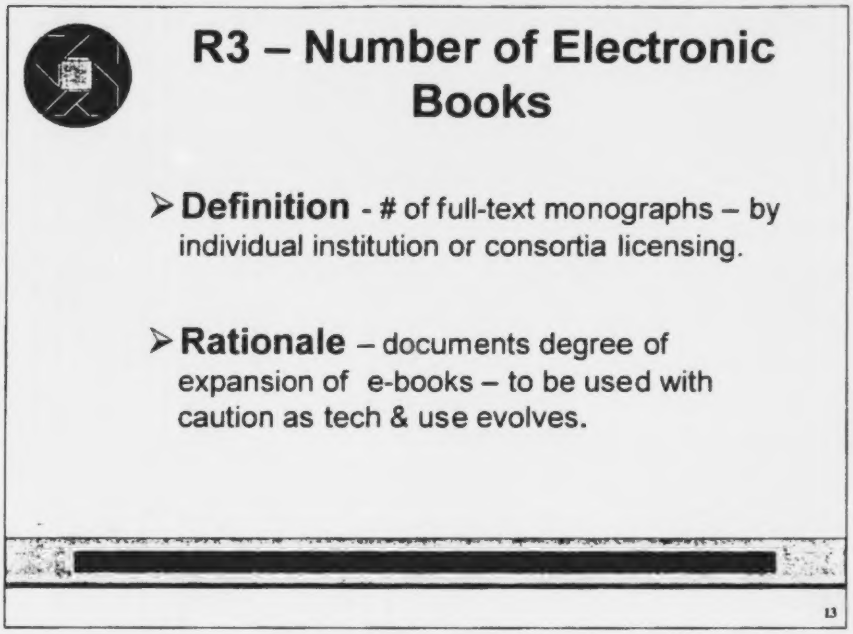
Process - As in the case of the number of electronic full-text journals, it is impossible to obtain the complete list of databases from a single source. Possible sources for the information include library catalog records (those records that point to Web addresses), library Web pages that list the database titles, the internal electronic resource management database, and vendor records (Web sites and contract documentation).

- Create a master list of electronic databases from all the sources available. Use a spreadsheet or database program to organize and maintain the list.
- Remove titles that do not meet the above-mentioned definition but keep duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
- Record the counts and be sure they are updated regularly. The library should also update the count information on the library Web site and/or in marketing brochures on a regular basis.

Special considerations: The unit of measurement here is the database not the whole service provided by a vendor. For example, if the library subscribes to OVID and the company provides five databases (ABI/Inform, Books in Print, CINAHL, INSPEC, and PsycINFO), then the count is 5, not 1. By the same token, if the library subscribes to three database packages (Academic Universe, Congressional Universe, and Statistical Universe) from Lexis-Nexis, the count is 3.

This count should not include freely available databases to which the library provides links or library-created finding aids.

Freely available databases and library-created finding aids are a valuable resource for many libraries. How to collect statistics relating to these resources will be addressed in the future.



R3 – Number of Electronic Books

- **Definition** - # of full-text monographs – by individual institution or consortia licensing.
- **Rationale** – documents degree of expansion of e-books – to be used with caution as tech & use evolves.

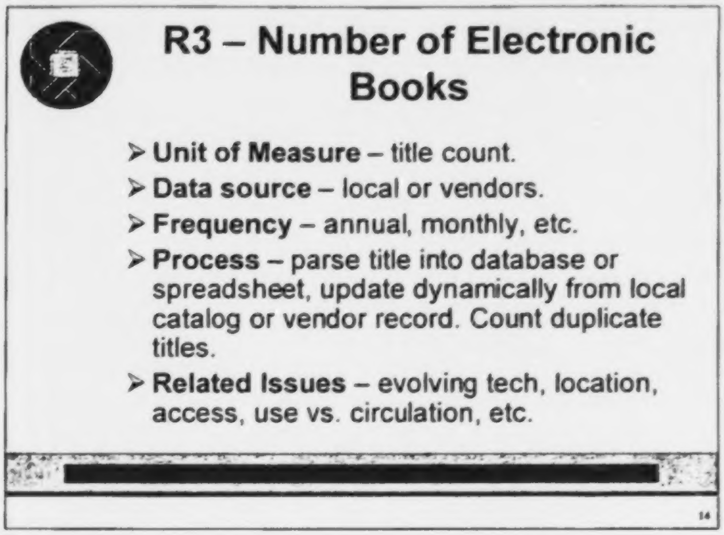
13

Definition: Number of electronic full-text monographs that the library offers to its users either through an individual licensing contract with the content providers or through other arrangements (e.g., regional or state consortium) where the library pays a reduced or no fee for access.

This includes electronic books purchased through vendors, such as netLibrary and Books24x7, and electronic books that come as part of aggregate services. It excludes internally digitized electronic books, electronic theses and dissertations, digitally created archival collections (e.g., Early English Books Online), and other special collections. This also excludes publicly available electronic books to which the library provides Web links. It does not include machine-readable books distributed on CD-ROM, or accompanied by print books.

Rationale: Networking technology in libraries has improved and increased dramatically user access to the electronic counterparts of some traditional sources. This statistic documents the degree of expansion of e-books. In the mid 90s, networking and resource sharing technologies provided libraries with print books and e-books that were made available through a library's networks.

Because the evolving nature of this statistic will heavily depend on technological enhancements, all libraries are encouraged to use extra caution while pursuing their institutional goals, missions, and visions. Moreover, the definition of e-books is still evolving. This statistic is an early attempt to keep track of this type of resource as it becomes more widely available.



R3 – Number of Electronic Books

- **Unit of Measure** – title count.
- **Data source** – local or vendors.
- **Frequency** – annual, monthly, etc.
- **Process** – parse title into database or spreadsheet, update dynamically from local catalog or vendor record. Count duplicate titles.
- **Related Issues** – evolving tech, location, access, use vs. circulation, etc.

Implementation

Collected by: Local and vendors

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

Procedures:

- For each electronic book collection, get the electronic title counts from either the providers or catalog records. Unlike electronic full-text journals and reference databases, it is not necessary to list the titles for each electronic book collection.
- Count any duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
- Record the counts and be sure they are updated regularly. The library should also update the count information on the library Web site and/or in marketing brochures on a regular basis.

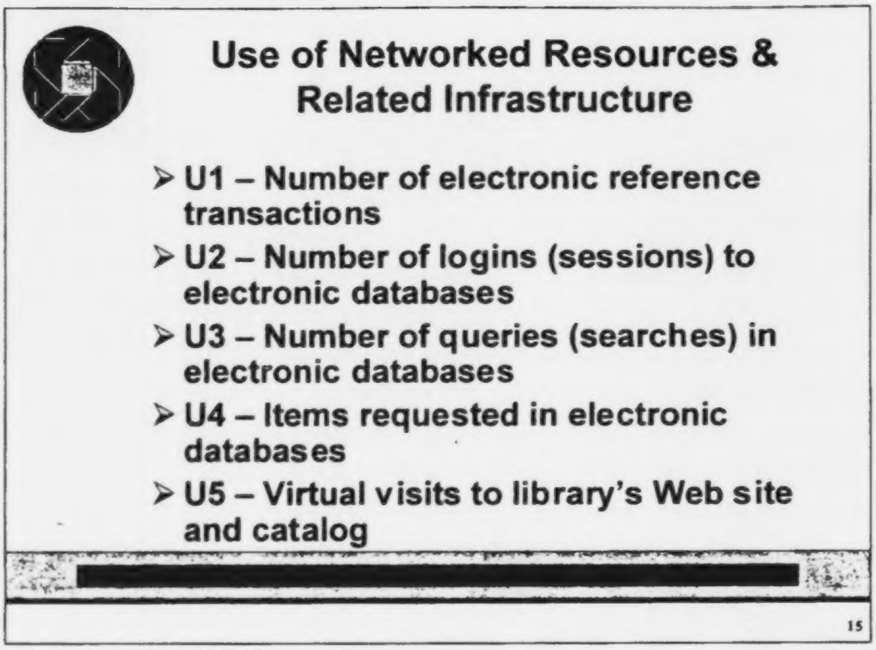
Special considerations: Do not include book collections that are a part of aggregate services and function more as a reference collection (e.g., MD Consult reference books, ProQuest's Early English Books Online, and books@OVID). They should be reported in the electronic reference databases.

Do not include freely available electronic books such as titles available from the National Academy Press.

Related issues: Electronic books, still evolving in terms of technology and adoption for use, present a number of issues in terms of definition and measurement, such as "location," accessibility (metadata and access points), and use versus circulation (e.g., is online use for 20 minutes a circulation, as it would be with reserve materials; or does a circulation of electronic books require a minimum period of use, such as 24 hours?).

- What about reference book collections provided by vendors? Should they be treated as electronic books, for example, or should they be treated as a database, on the grounds that they are used as databases?
- Count only those books that a user can check out, as they would traditional books. Unlike traditional books that the library purchases and owns, electronic books can be subscribed to for an ongoing fee. In this case, the library accounting system may treat these as serials rather than books because of the type of payment. It is relatively easy to keep track of the number of electronic books right now since most libraries deal with only a handful of e-book vendors, such as netLibrary and Books24x7. But in the future, it will become increasingly difficult to do this as the sources of electronic books proliferate.

Finally, some provisions of contractual agreements between libraries and vendors may limit the level of use of e-books. These issues need be addressed in future research.



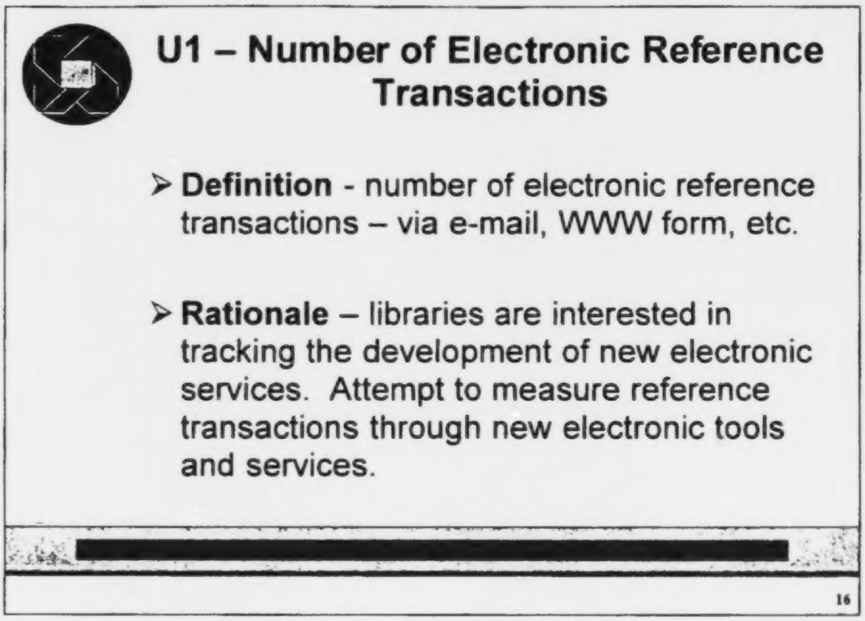
Use of Networked Resources & Related Infrastructure

- U1 – Number of electronic reference transactions
- U2 – Number of logins (sessions) to electronic databases
- U3 – Number of queries (searches) in electronic databases
- U4 – Items requested in electronic databases
- U5 – Virtual visits to library's Web site and catalog

4.3.2 Statistics Related to Use of Electronic Networked Resources and Services

High use of a library resource or service implies a collection development program that is working to create access to the resources customers need. Use and the need can also identify resources and services that are seen as particularly valuable in the education and research enterprise and should be expanded, or perhaps resources and services that should be discontinued due to lack of use and interest. Whether provided by vendors or collected institutionally, usage statistics can help a library administrator make decisions and plan for the future in order to meet not only users' expectations and needs but also institutional goals. The reported data can also provide other information as to where and when people use the library's materials and how well the library serves its target audience and anticipates their potential needs.

The cost of providing access to networked resources and services can be more expensive than that of traditional counterparts. Depending heavily on earlier ICOLC guidelines, the E-Metrics use measures put this in the perspective of the changing academic research library environment. The purpose of the use measures is to provide statistics relating to the use of networked services and resources. Therefore, it is expected that library administrators can reconsider some resource allocation issues as the number of resources and services tend to increase while people are provided greater access. Please note that, as with most of the statistics in this study, statistics related to the use of library resources and services should be revisited and perhaps modified as the technology advances.



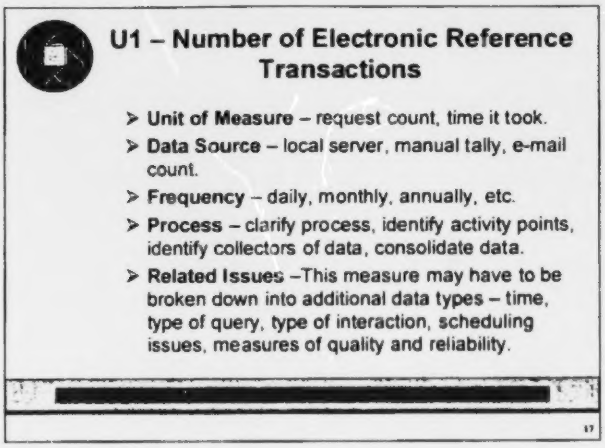
U1 – Number of Electronic Reference Transactions

- **Definition** - number of electronic reference transactions – via e-mail, WWW form, etc.
- **Rationale** – libraries are interested in tracking the development of new electronic services. Attempt to measure reference transactions through new electronic tools and services.

Definition: Number of electronic reference transactions conducted via email, a library's Web site, or other network communications mechanisms designed to support electronic reference. An electronic reference transaction *must* include a question *either* received electronically (e.g., via e-mail, WWW form, etc.) *or* responded to electronically. Those transactions that are both received and responded to electronically are counted as *one* transaction. This count excludes phone and fax traffic unless either the question or answer transaction occurs via the described manner. It includes the counts accrued from participation in any local and national projects, such as DigiRef and the Library of Congress's CDRS (Collaborative Digital Reference Service).

A reference transaction is an information contact, which involves the knowledge, use, recommendations, interpretation, or instruction in the use of one or more information sources by a member of the library staff.

Rationale: Libraries are making more of their services available electronically and are interested in tracking the development of a new and emerging library service. There is a need to better document this transition to facilitate and improve resource allocation activities. This statistic represents reference activities conducted electronically in the library. It is an attempt to measure reference transactions through new electronic tools.



U1 – Number of Electronic Reference Transactions

- **Unit of Measure** – request count, time it took.
- **Data Source** – local server, manual tally, e-mail count.
- **Frequency** – daily, monthly, annually, etc.
- **Process** – clarify process, identify activity points, identify collectors of data, consolidate data.
- **Related Issues** –This measure may have to be broken down into additional data types – time, type of query, type of interaction, scheduling issues, measures of quality and reliability.

Implementation

Collected by: Local

Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly). This statistic can be collected in the same manner as the library gathers other reference transactions data.

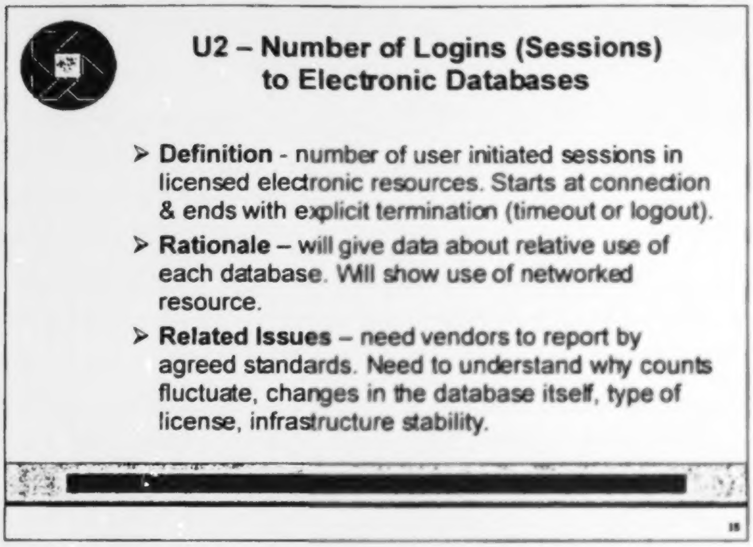
Procedures:

- Select a typical week (or month) to run a sample study. Be sure to vary the specific week (or month) chosen over the course of a year or from year to year to account for seasonal fluctuations.
- Key tasks include distributing a daily tally sheet, collecting the daily tally sheet, adding each day's totals to a weekly figure, and being available to respond to data collection problems should they occur.
- Transactions may be via e-mail, a form on a Web page, etc. Electronic reference transactions may involve more than reference desk staff (e.g., Web master, various reference personnel, library director, volunteers, etc.). Establish an administrative procedure to report electronic reference transaction counts to a designated staff person, no matter who receives the questions or answers the reference requests.
- Disseminate the new procedure and rationale. Several notices throughout the year may be necessary.
- Report an electronic reference transaction as you would a face-to-face reference transaction. Thus, one e-mail request may contain several reference questions taking varying times to complete. For example, one e-mail request could contain two relatively short reference questions and one reference question that took 10-15 minutes to answer. Count the number of requests, not the number of questions. Thus, in the example you would report one (1) as the number of electronic reference transactions even though there were three questions. Report counts using pre-established local library reporting periods (weekly, monthly, etc.).
- Indicate and describe any additional methods used outside of this definition and guidelines.

Special considerations: Unless the library uses electronic reference management software to collect and report transaction data, it is difficult to keep track of a complete reference transaction cycle (query and response) because of time-delays and the involvement of several parties.

As stated in the definition, the statistic includes the number of service transactions provided to patrons outside the university or the parent institution that the library serves, through regional or national cooperative efforts and through library policies.

Related issues: Reference services are undergoing rapid changes. Libraries are experimenting with different modes of electronic reference. One could say that simple email transactions that are prominently mentioned in the procedures are not much different from traditional reference services. How can a library measure quality in providing different types of electronic reference services such as live-chat with text/voice/video? Will this measure help the library determine user demand and thereby plan for resource allocation? To answer these questions, libraries need to collect more detailed information such as length of time taken to answer questions, types of questions by types of transactions, and so on. Also, this statistic is likely to produce some useful figures and trends regarding staff support and allocation in reference activities.



U2 – Number of Logins (Sessions) to Electronic Databases

- **Definition** - number of user initiated sessions in licensed electronic resources. Starts at connection & ends with explicit termination (timeout or logout).
- **Rationale** – will give data about relative use of each database. Will show use of networked resource.
- **Related Issues** – need vendors to report by agreed standards. Need to understand why counts fluctuate, changes in the database itself, type of license, infrastructure stability.

18

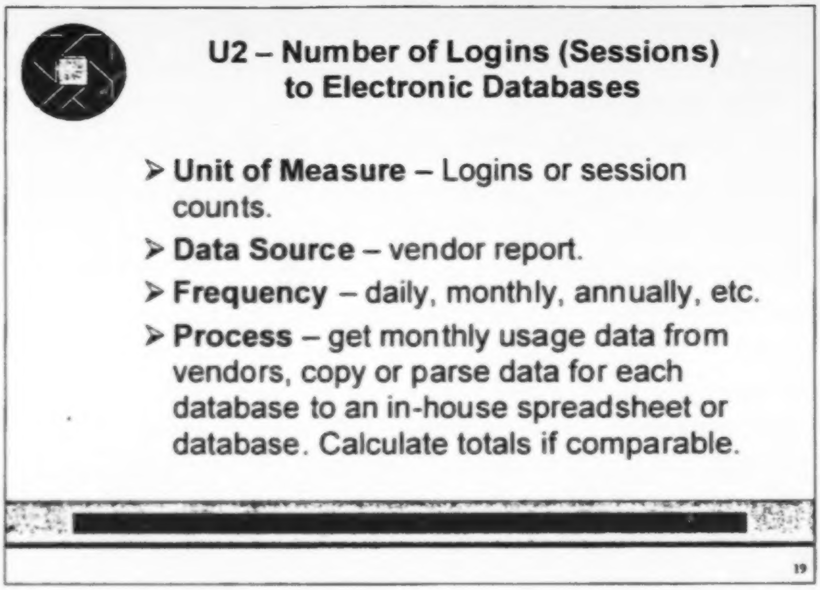
Definition: Number of user initiated sessions in licensed electronic resources. A session or login is one cycle of user activities that typically starts when a user connects to a database and ends with explicit termination of activities (by leaving the database through logout or exit) or implicit termination (time out due to user inactivity). Licensed electronic resources also include those databases that institutions mount locally.

Rationale: One purpose of having a networked environment is to promote connectedness and accessibility to a variety of information resources, hence the need for this measure. Also, the gradual shift in the materials expenditures from traditional print-based resources to electronic databases can be understood with the measure. This measure will produce a count of how often specific databases are used and complement traditional physical attendance counts.

Related issues: When analyzing the login counts, it might be important to explain any increases or decreases in the figures. Specify, for example, whether the increase comes from (1) the addition of new databases, (2) databases which did not report the statistic in the past but have now begun reporting, (3) increased demand, and/or (4) an increase in the number of simultaneous users.

Problems with the comparability of login counts from different vendors is a serious threat to the utility of the combined count. Content providers use different time-out thresholds (ranging from 7 to 30 minutes on average). Also, because of the IP-based authentication, several sessions conducted at the same public workstation can be counted as a single login. Alternatively, libraries can collect attempted logins to various licensed databases by making users go through a central gateway (which counts all attempted logins). This will ensure that one login attempt to a database is the same as a login to other databases. However, what this data collection method misses is user logins that go directly to content provider sites. It is unclear how many user logins fall into this category, but the phenomenon certainly results in a substantial undercount of user logins.

While the gross login figure is useful, it is useful only for trend plotting and gross justification of electronic resources. Within the library, the usage measures of licensed electronic resources have many users and uses. Circulation of usage statistics on the database title level (or in an extreme case on the journal title level) and discussion of any noticeable changes (or lack thereof) need to occur at various levels among the concerned parties, including collection development personnel, Web master(s), technical services staff, and so on.



U2 – Number of Logins (Sessions) to Electronic Databases

- **Unit of Measure** – Logins or session counts.
- **Data Source** – vendor report.
- **Frequency** – daily, monthly, annually, etc.
- **Process** – get monthly usage data from vendors, copy or parse data for each database to an in-house spreadsheet or database. Calculate totals if comparable.

Implementation:

Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. At least on the database title level, usage statistics should be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

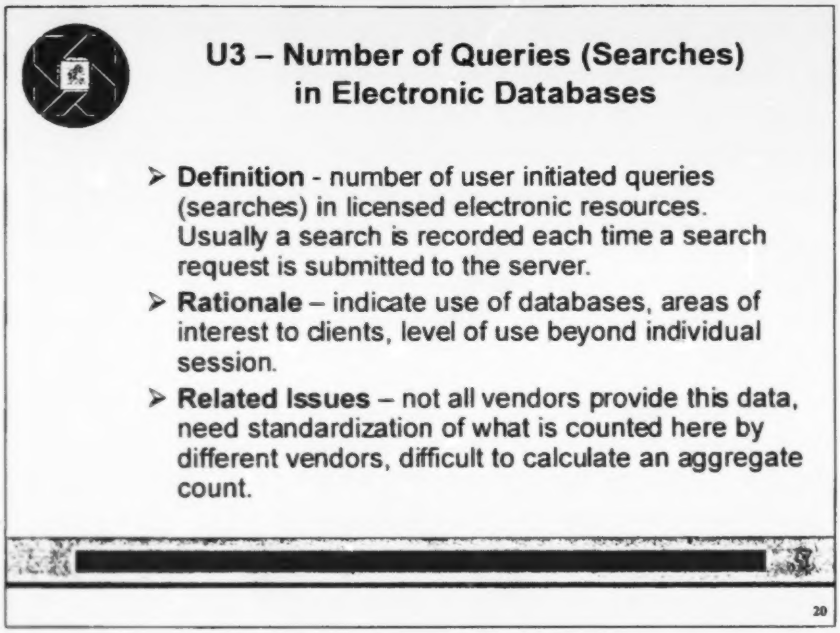
Collected by: Vendor

Frequency: Monthly, but can be reported quarterly or annually

Procedures:

- Process monthly usage statistics from vendors and copy or import the number of attempted sessions in each database (in each journal collection for full-text journals) to an in-house spreadsheet or database file.
- Calculate the total sessions for a given month by adding the number of sessions from each database or journal collection.

Special considerations: Not all vendors report this statistic. Therefore, it will be necessary to qualify the statistic with a sentence such as this: "We have 150,000 logins recorded from 120 databases out of 200 subscribing. We cannot report this statistic for the remaining 80 databases because the vendor does not supply login (session) information to customers."



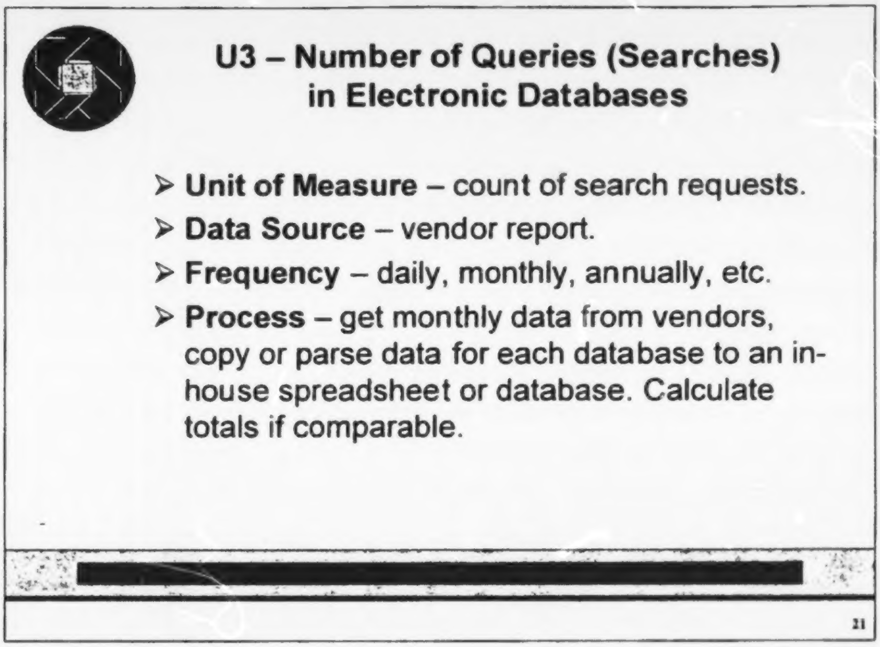
U3 – Number of Queries (Searches) in Electronic Databases

- **Definition** - number of user initiated queries (searches) in licensed electronic resources. Usually a search is recorded each time a search request is submitted to the server.
- **Rationale** – indicate use of databases, areas of interest to clients, level of use beyond individual session.
- **Related Issues** – not all vendors provide this data, need standardization of what is counted here by different vendors, difficult to calculate an aggregate count.

Definition: Number of user initiated queries (searches) in licensed electronic resources. A search is intended to represent a unique intellectual inquiry. Typically, a search is recorded each time a search request is sent/submitted to the server.

Rationale: This statistic provides libraries with an indication of the databases that are most heavily used, areas of user interest, database popularity, and a level of usage detail that goes beyond an initial session. It also can provide important information for billing purposes, as some vendors charge for database usage by number of searches. This statistic can complement U1, the number of electronic reference transactions, as more user requests bypass staff mediations. Some portion of this statistic is also analogous to in-library use of reference sources.

Related issues: Different assumptions about and mechanisms for collecting search counts by different vendors are potential threats to the combined count.



U3 – Number of Queries (Searches) in Electronic Databases

- **Unit of Measure** – count of search requests.
- **Data Source** – vendor report.
- **Frequency** – daily, monthly, annually, etc.
- **Process** – get monthly data from vendors, copy or parse data for each database to an in-house spreadsheet or database. Calculate totals if comparable.

Implementation

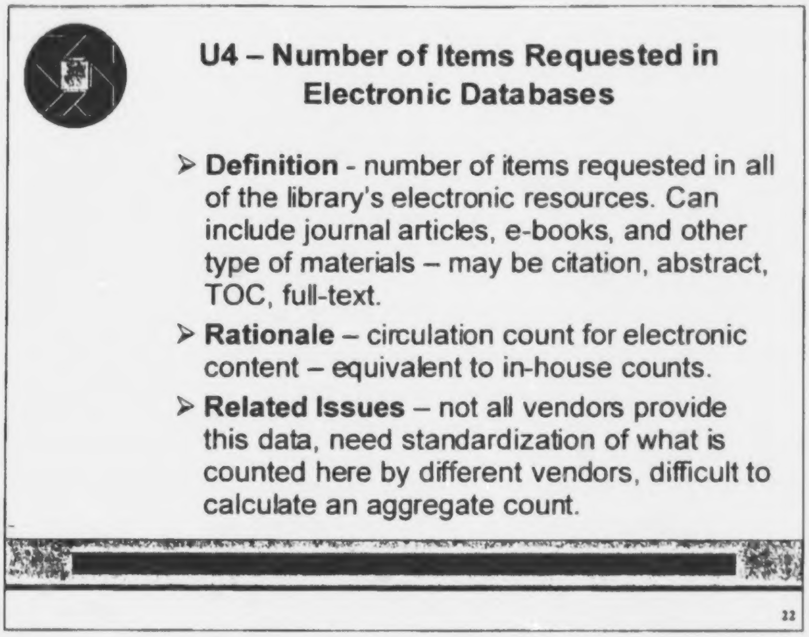
Collected by: Vendor

Frequency: Monthly, but can be reported quarterly or annually

Procedures: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. Usage statistics need to be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

- Process monthly usage statistics from vendors and copy or import the number of attempted searches in each database to an in-house spreadsheet or database file.
- Calculate the total number of searches for a given month by adding the number of searches from each database or journal collection.

Special considerations: Because some vendors do not report this statistic, it will be necessary to qualify the statistic with a sentence such as this: "We have 150,000 searches recorded from 120 databases out of 200 subscribing. The other 80 do not provide this statistic."



U4 – Number of Items Requested in Electronic Databases

- **Definition** - number of items requested in all of the library's electronic resources. Can include journal articles, e-books, and other type of materials – may be citation, abstract, TOC, full-text.
- **Rationale** – circulation count for electronic content – equivalent to in-house counts.
- **Related Issues** – not all vendors provide this data, need standardization of what is counted here by different vendors, difficult to calculate an aggregate count.

22

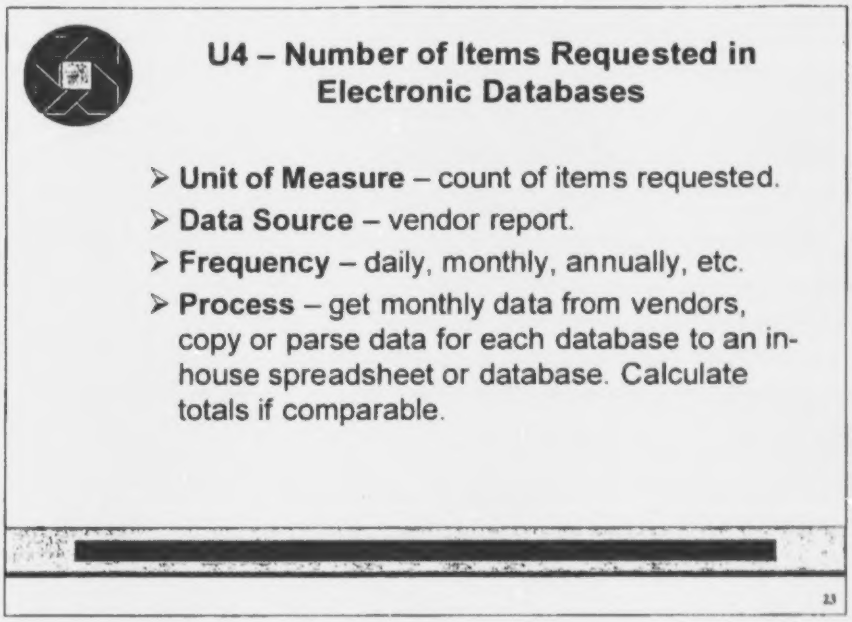
Definition: Number of items requested in all of the library's licensed electronic resources. These resources may include journal articles, e-books, reference materials, and non-textual resources that are provided to the library's users through licensing and contractual agreements. The user requests may include viewing, downloading, emailing, and printing to the extent the activity can be recorded and controlled by the server rather than browser.

The items reported depend on the type of content. Examples include citations, abstracts, tables of contents, and full-text articles (ASCII, HTML, PDF, or PS).

Rationale: This statistic provides a circulation count for electronic contents in a way analogous to the traditional circulation of books. Given the fact that libraries do not have good measurements of in-house materials usage, particularly serials usage, this statistic helps libraries understand in-library use patterns that were heretofore difficult to measure.

Related issues: Different vendors apply different assumptions and mechanisms in collecting items requested counts. This lack of standardization makes it difficult to calculate an aggregate count.

We do not have good measurement of in-house materials usage, particularly journal usage. However, electronic journals and databases allow libraries to find out how often materials are requested. Having in-house usage figures is important for understanding the dynamics of usage between print and electronic journals, so that we can ascertain any correlation between them.



U4 – Number of Items Requested in Electronic Databases

- **Unit of Measure** – count of items requested.
- **Data Source** – vendor report.
- **Frequency** – daily, monthly, annually, etc.
- **Process** – get monthly data from vendors, copy or parse data for each database to an in-house spreadsheet or database. Calculate totals if comparable.

Implementation

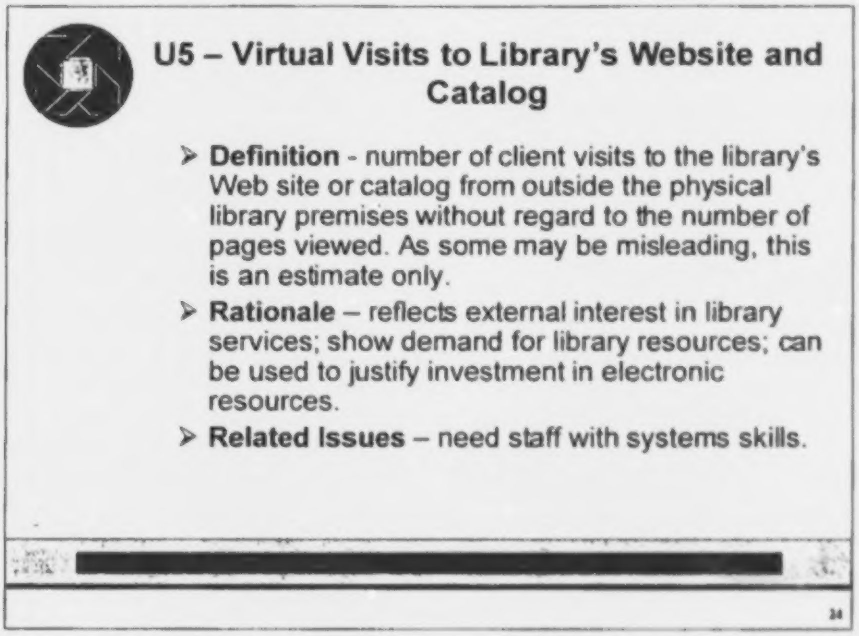
Collected by: Vendor

Frequency: Monthly, but can be reported quarterly or annually

Procedures: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. Usage statistics should be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

- Process monthly usage statistics from vendors and copy or import the number of items selected for viewing, downloading, and emailing in each database. Count the number and type of items users selected: abstracts, citations, and full-texts.
- Calculate the total number of items for a given month by adding the number of items requested from each database or journal collection.

Special considerations: Because some vendors do not report this statistic, it will be necessary to qualify the statistic with a sentence such as this: "More than 150,000 items were requested from 120 databases out of 200 subscribing. The other 80 do not provide this statistic. Among the requested items, 100,000 were some form of full-text records."



U5 – Virtual Visits to Library's Website and Catalog

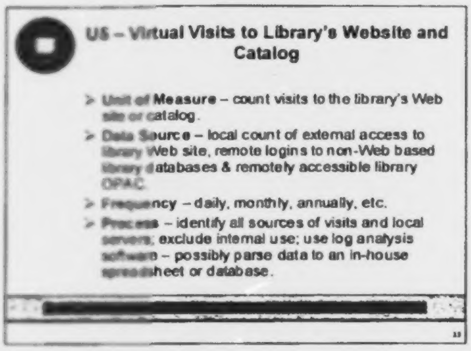
- **Definition** - number of client visits to the library's Web site or catalog from outside the physical library premises without regard to the number of pages viewed. As some may be misleading, this is an estimate only.
- **Rationale** – reflects external interest in library services; show demand for library resources; can be used to justify investment in electronic resources.
- **Related Issues** – need staff with systems skills.

Definition: This is defined as user visits to the library's Web site or catalog from outside the physical library premises regardless of the number of pages or elements viewed. If a user looks at 16 pages and 54 graphic images while at a Web site, that user registers one visit on the Web server. All visits to the Web site should be counted regardless of repetition by one user. A visit is usually determined by a user's IP address, which can be misleading due to Internet Service Providers (ISPs) and Firewalls or Proxy Servers. Thus, this measure is actually an estimate of the visits.

Rationale: Use of the Web site or catalog from outside the library reflects interest in library services. The role of networked services is to expand the reach of libraries beyond their physical boundaries. This statistic helps describe the significance of networked services use by measuring the number of virtual accesses. This will also give an opportunity for the library to compare the demand placed on their networked resources with that for other popular information-oriented Web sites (such as Excite, Lycos, etc.).

Related issues: This measurement requires a relatively high degree of technical skills either on staff or available from the library's Web site host.

344



U5 – Virtual Visits to Library's Website and Catalog

- **Unit of Measure** – count visits to the library's Web site or catalog.
- **Data Source** – local count of external access to library Web site, remote logins to non-Web based library databases & remotely accessible library OPAC.
- **Frequency** – daily, monthly, annually, etc.
- **Process** – identify all sources of visits and local servers; exclude internal use; use log analysis software – possibly parse data to an in-house spreadsheet or database.

Implementation:

Collected by: Local

Frequency: Reported annually, although internal reporting will be more frequent (e.g., weekly, monthly, and quarterly).

Procedures:

Identify all sources of virtual visits to the library. This may involve activities that take place on more than one Web server. Some of the Web servers may be owned by the library and some may be owned or maintained by another department in the university, an Internet Service Provider (ISP), or other library vendors (e.g., library OPAC provider).

- Exclude internal use within the premises of the library from the counts for this measure when possible. Two common approaches are using IP addresses or some form of authentication tagged to each transaction. In terms of external visits to the library, three common sources are: external access to the library's Web page, remote logins (sessions) to non-Web-based library databases, and remotely accessible library OPAC.
- Develop strategies for collecting the data from each of these sources of virtual visits. Different software may be needed to measure each electronic source of virtual visits. In some cases, the library may calculate the virtual visits using one or more log analysis software packages. In other cases, the external owner of the Web server or service (the ISP) must provide the data. Discussions may need to be held with these service providers to obtain the needed data. In still other cases, custom programs may have to be developed.
- In the case of library Web pages housed on the library server, identify, configure, and install appropriate log analysis software. Determine log analysis software definition that corresponds to the virtual visit definition.

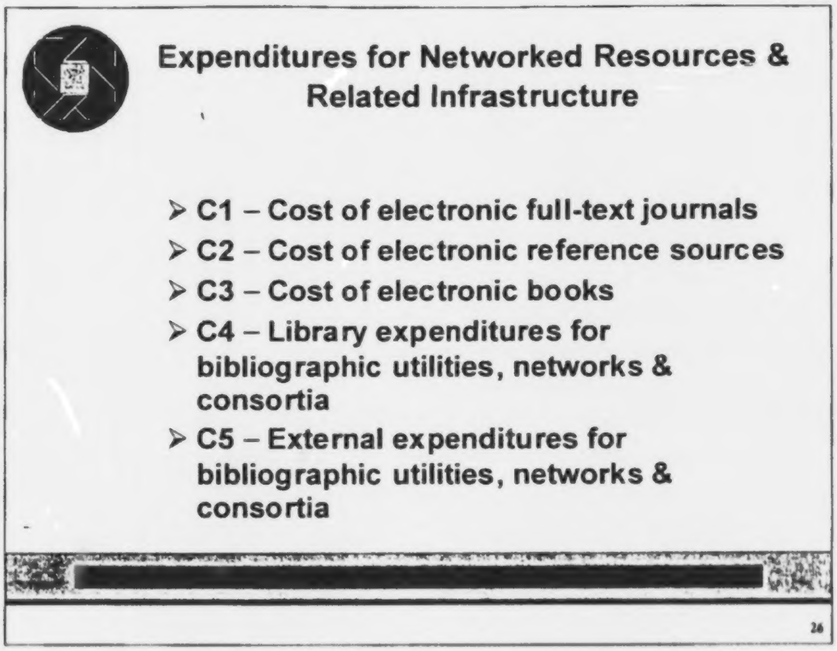
Note: Different log analysis software packages may count virtual visits in different ways, so the count obtained will by necessity be an estimate. Arrange with the server technical staff for regular (monthly) reporting of internal visits at the various user access Internet workstations, external library user virtual visits, and total virtual visits (internal visits plus external visits). Run the log analysis software.

- In the case of library Web pages housed on an ISP's server, identify the log analysis software the ISP uses. Determine the definition of "visit" used by the log analysis software that corresponds to the virtual visit definition with the assistance of the ISP. Arrange with the ISP for regular (monthly) reporting of internal library visits at the various user access Internet workstations, external library user virtual visits, and total virtual visits (internal visits plus external visits).
- Where virtual visit counts include the aggregate of internal and external visits, indicate this in your report.

Special considerations: Count all visits to the Web site regardless of repetition by one user as long as each visit meets the criteria for this statistic.

After one user connects to the Internet, several users could conduct multiple different searches in the electronic service. In some cases, e.g., Internet-accessible OPAC use inside the library, several users, one after the other, might make use of the same established connection. In most systems, a connection is cut off after a specified period of non-use, thus solving part of the problem. The best existing method of collecting virtual visits is to use log analysis software. The log analysis software producers may define virtual visits differently. For example, does a visit end after a time-out period of 30 minutes, 15 minutes, or some other time? The recommended time-out period is 30 minutes, but a local library may have to accept the available log analysis software's definition even if it varies from the above.

Some libraries will find it difficult to report every virtual visit. For example, libraries may have difficulty counting the use of library OPACS because their vendors do not provide this information. Make a record of those sources of virtual visits not counted. Do not estimate virtual visits for which data are not available.



Expenditures for Networked Resources & Related Infrastructure

- C1 – Cost of electronic full-text journals
- C2 – Cost of electronic reference sources
- C3 – Cost of electronic books
- C4 – Library expenditures for bibliographic utilities, networks & consortia
- C5 – External expenditures for bibliographic utilities, networks & consortia

Statistics Related to Expenditures for Electronic Resources and Related Infrastructure

This portion of the statistics is based on the *ARL Supplementary Statistics* Survey (the most recent survey instruction available at http://www.arl.org/stats/arlstat/#sup). In collecting the statistics, the library should refer to the procedures followed and the amounts reported in response to the *ARL Supplementary Statistics* Survey.

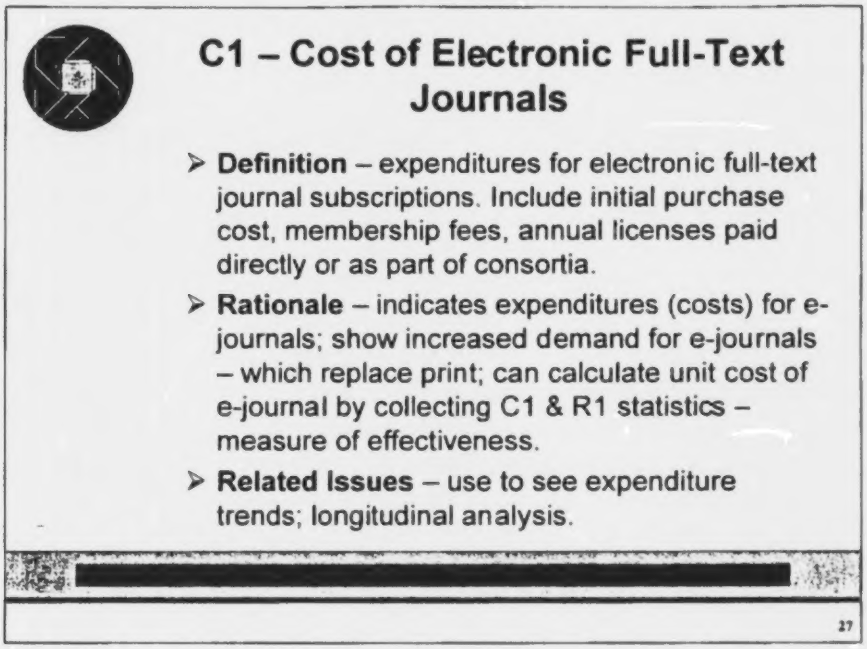
These statistics were developed by ARL to determine expenditure patterns on electronic and networked resources and the effect of new types of library resources and services, those delivered both individually and collectively with other institutions, on library expenditures. These measures are expected to help ARL libraries justify their growing budgets due to the great expense of electronic and networked services. These measures can help answer such questions as: How much are research libraries spending for electronic resources collectively and how much on average? How do expenditures for electronic resources compare across several research libraries?

We have not included the cost of the technical staff and their training, the networking and equipment to provide access to the electronic resources as well as the time of all the staff involved. This will have to be addressed in the future.

General Introduction to C1-C3

The report should include expenditures for electronic indexes and reference tools, electronic full-text periodical collections and electronic journal back-files, and online searches of remote databases—whether accessed remotely or installed locally from CD-ROM, magnetic tapes, etc. The report should also include expenditures for materials purchased jointly with other institutions if such expenditures can be separated from other charges for joint services, fees paid to bibliographic utilities if the portion paid for computer files and search services can be separately counted, and equipment costs when they are inseparably bundled into the price of the information product.

Expenditures for bibliographic utilities, networks, and consortia that are unrelated to end-user database access should be reported in C4, not in C1 through C3.



C1 – Cost of Electronic Full-Text Journals

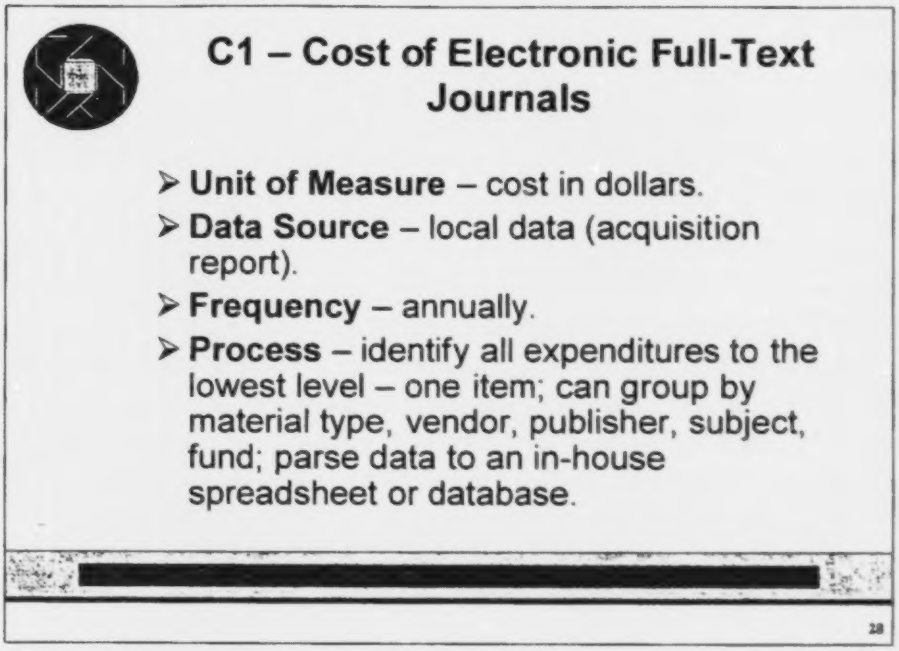
- **Definition** – expenditures for electronic full-text journal subscriptions. Include initial purchase cost, membership fees, annual licenses paid directly or as part of consortia.
- **Rationale** – indicates expenditures (costs) for e-journals; show increased demand for e-journals – which replace print; can calculate unit cost of e-journal by collecting C1 & R1 statistics – measure of effectiveness.
- **Related Issues** – use to see expenditure trends; longitudinal analysis.

Definition: Expenditures for electronic full-text journal subscriptions that the library provides to its users. Include both initial purchase cost, membership fees (such as JSTOR) as well as annual access and service fees paid directly or through consortia arrangements.

Rationale: This statistic, cost of electronic full-text journals, was developed by ARL to find out how much libraries are spending on electronic full-text journals and how new forms of electronic journals are replacing traditional journals and scholarly publications. It also indicates the extent of budget allocations for electronic resources. Furthermore, this statistic allows libraries to calculate unit costs of e-journals after collecting C1 and R1 statistics, and thus aids libraries in deciding how effectively they are serving their potential and intended audiences, and in benchmarking with the other institutions.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources at *a given point in time* (most likely at the end of the reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but can be very time consuming. You can report the annual amount paid without prorating on the basis that over the years the figures will even out.

Some electronic full-text journals come either as a free service with a print subscription or as part of a print-plus-online-access subscription (the library pays extra for electronic access). In the first case, the problem is whether or not to post any amount for the cost of electronic access. In the latter case, the question is how much of the cost can be attributed to electronic access.



C1 – Cost of Electronic Full-Text Journals

- **Unit of Measure** – cost in dollars.
- **Data Source** – local data (acquisition report).
- **Frequency** – annually.
- **Process** – identify all expenditures to the lowest level – one item; can group by material type, vendor, publisher, subject, fund; parse data to an in-house spreadsheet or database.

28

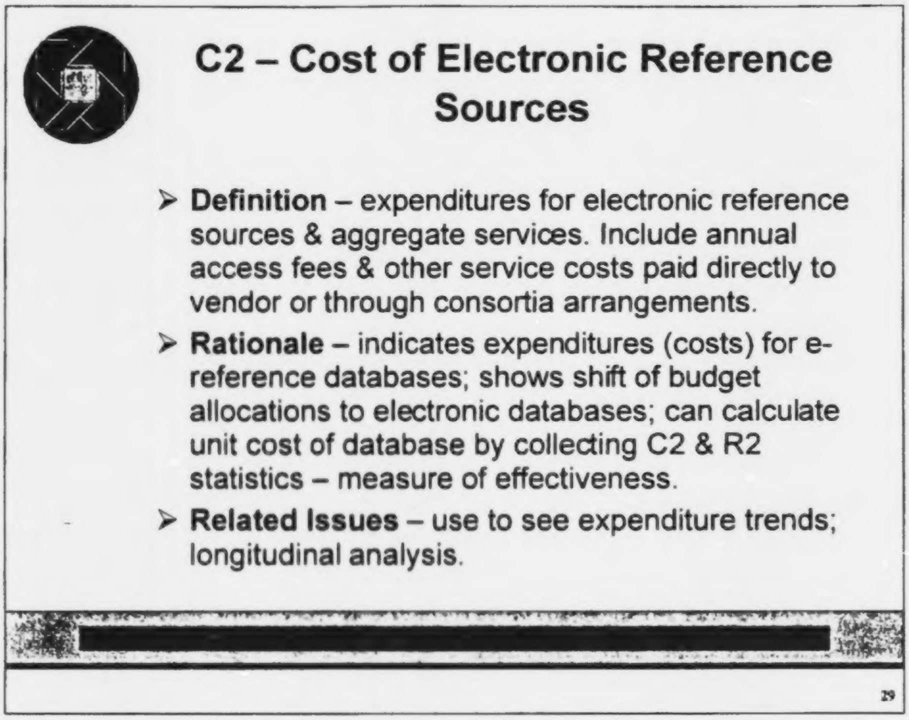
Implementation

Collected by: Local

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

Procedures: For the definition of electronic full-text journals, please refer to the definition of R1. Current library accounting systems do not support coding of materials expenditures by the categories used in the manual. Therefore, it may become necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics. Significant coordination is required for setting up the structure of the file, but in the long run may streamline many aspects of the management of electronic licensed materials.

- Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office.
- If you have not done so, organize the data using the sample worksheet in Appendix C, Figure C.1.
- Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
- If a fee is paid to a consortium or other joint arrangement, include the amount. In the case where a fee is paid for an aggregate service and the service contains different categories of resources (full-text journals and reference sources) as a bundle, use an estimate based on expected or historical use, or list prices.
- Note any major commitments (such as JSTOR one-time costs) that do not occur year to year and that significantly influence the reported amount.



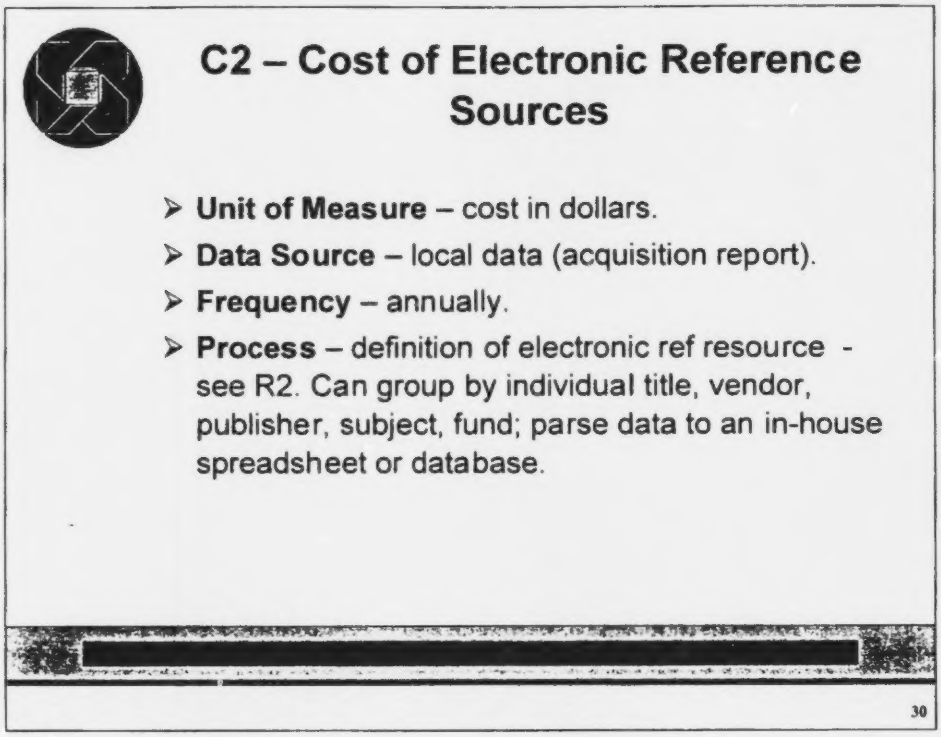
C2 – Cost of Electronic Reference Sources

- **Definition** – expenditures for electronic reference sources & aggregate services. Include annual access fees & other service costs paid directly to vendor or through consortia arrangements.
- **Rationale** – indicates expenditures (costs) for e-reference databases; shows shift of budget allocations to electronic databases; can calculate unit cost of database by collecting C2 & R2 statistics – measure of effectiveness.
- **Related Issues** – use to see expenditure trends; longitudinal analysis.

Definition: Expenditures for electronic reference sources and aggregate services that the library provides to users either through individual licensing contracts with content providers or through consortia or other arrangements where the library pays some fees. These fees include both annual access fees and other service costs paid to the vendor directly or through consortial arrangements.

Rationale: This statistic, cost of electronic reference sources, was developed by ARL to determine how much libraries are spending on electronic reference sources and how new forms of electronic reference sources are replacing traditional reference materials. It also gives insight into shifts in budget allocations from print to electronic materials, or new allocations exclusively for electronic materials. Furthermore, this statistic allows libraries to calculate unit costs of electronic reference sources after collecting C2 and R2 figures. This figure assists libraries in making decisions about how effectively they are serving their potential and intended audience, and in benchmarking with other institutions.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources *at a given point in time* (most likely at the end of reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but can be very time consuming. You can report the annual amount paid without prorating on the basis that over the years the figures will even out.



C2 – Cost of Electronic Reference Sources

- **Unit of Measure** – cost in dollars.
- **Data Source** – local data (acquisition report).
- **Frequency** – annually.
- **Process** – definition of electronic ref resource - see R2. Can group by individual title, vendor, publisher, subject, fund; parse data to an in-house spreadsheet or database.

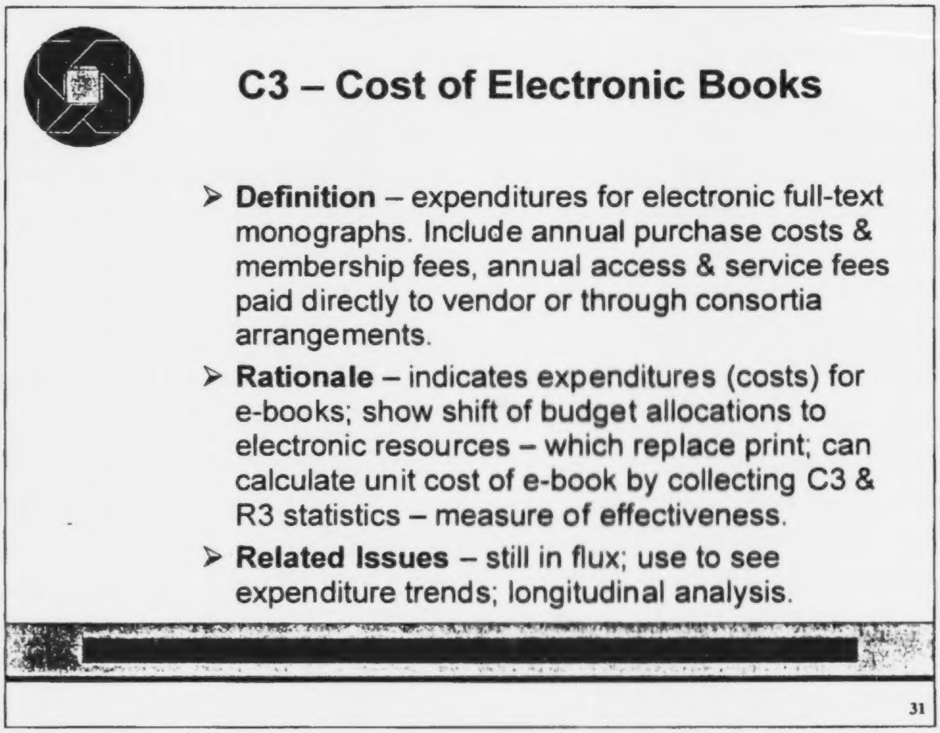
Implementation

Collected by: Local

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

Procedures: For the definition of electronic reference sources, please refer to the definition of R2. For libraries that do not have acquisitions systems which support coding of materials expenditures by the categories used in the manual, it may be necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics.

- Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office.
- If you have not done so, organize the data using the sample worksheet in Appendix C, Figure C.1.
- Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
- If a fee is paid to a consortium or through other joint arrangement, include the amount. If a fee is paid for an aggregate service and the service contains different categories of resources (full-text journals and reference sources) as a bundle, use an estimate based on expected or historical use, or list prices.
- In the comments field of the sample worksheet (Appendix C, Figure C.1), report any major commitments that do not occur year to year and that significantly influence the reported amount.



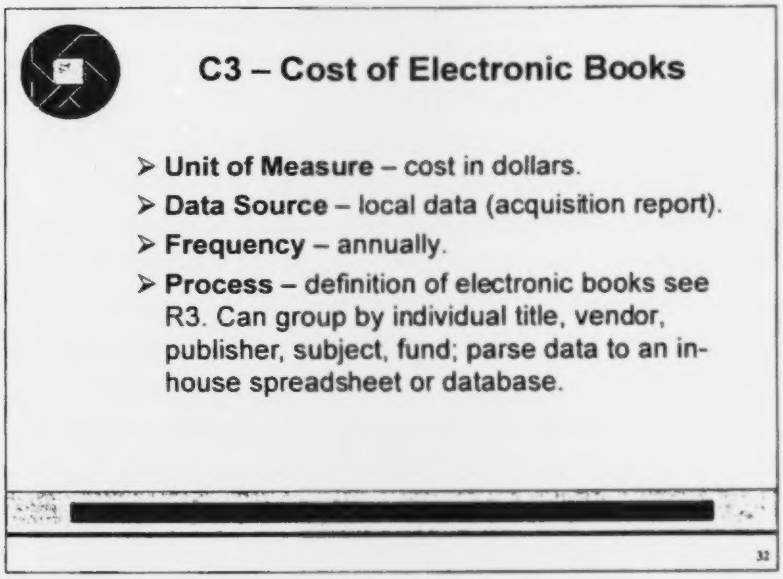
C3 – Cost of Electronic Books

- **Definition** – expenditures for electronic full-text monographs. Include annual purchase costs & membership fees, annual access & service fees paid directly to vendor or through consortia arrangements.
- **Rationale** – indicates expenditures (costs) for e-books; show shift of budget allocations to electronic resources – which replace print; can calculate unit cost of e-book by collecting C3 & R3 statistics – measure of effectiveness.
- **Related Issues** – still in flux; use to see expenditure trends; longitudinal analysis.

Definition: Expenditures for electronic full-text monographs that the library offers to its users. Include both initial purchase costs and membership fees as well as annual access and service fees paid directly or through consortia arrangements.

Rationale: This statistic, cost of electronic books, was developed by ARL to determine how much libraries were spending on electronic books. It also gives an idea about the extent of budget allocations for electronic resources. Furthermore, this statistic allows libraries to calculate unit costs of e-books after collecting C3 and R3 statistics, aids them in determining how effectively they are serving their potential and intended audiences, and assists them in benchmarking with other institutions.

Related issues: In many instances, the physical form of the material (print, electronic) may change the nature of the object. An electronic book is a good example. With enhancements such as full-text searching (although print books too have some search capability through tables of contents and indexes), electronic books support new forms of searching not present in print.



C3 – Cost of Electronic Books

- **Unit of Measure** – cost in dollars.
- **Data Source** – local data (acquisition report).
- **Frequency** – annually.
- **Process** – definition of electronic books see R3. Can group by individual title, vendor, publisher, subject, fund; parse data to an in-house spreadsheet or database.

Implementation

Collected by: Local

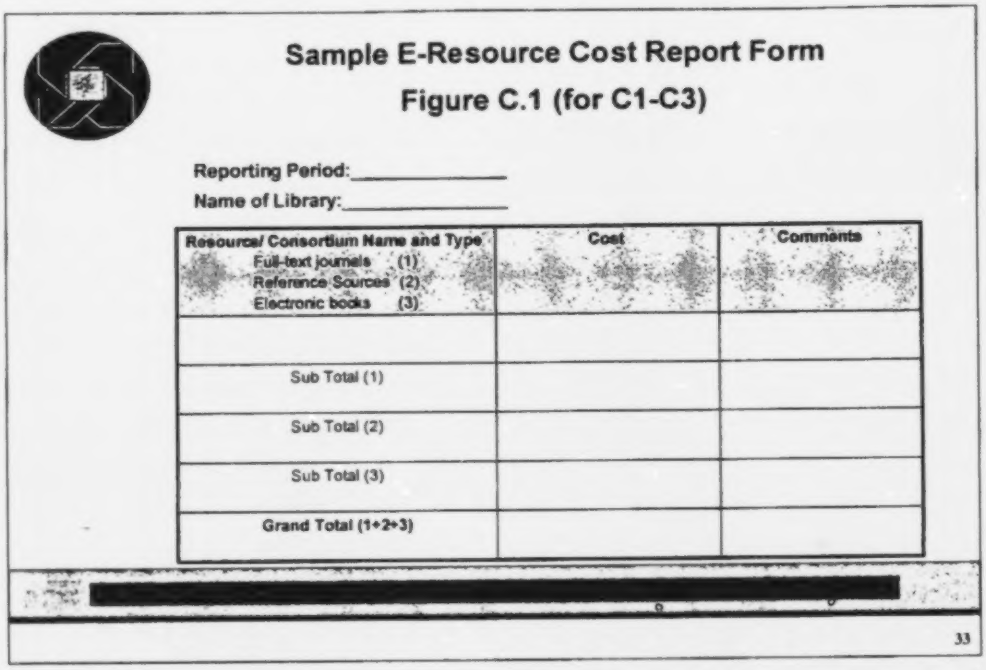
Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)

Procedures: For the definition of electronic books, please refer to the definition of R3. Current library accounting systems generally do not support coding of materials expenditure by the categories used in the manual. [See note for 3.2.4.5] Therefore, it may become necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably, a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics.

- Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office. You may also need to review circulation records to verify the accuracy of invoices if additional per-use fees are paid (royalty on use, as with E-Reserves).
- If you have not done so, organize the data using the sample worksheet in Appendix C, Figure C.1.
- Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
- If a fee is paid to a consortium or other joint arrangement, include the amount.
- Note any major commitments (such as netLibrary purchase costs) that do not occur year to year and that significantly influence the reported amount.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources at *a given point in time* (most likely at the end of reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but it can be very time consuming. You can report the annual amount paid without prorating with the rationale that over the years the figures will even out.

Traditionally books are purchased on a one-time payment in exchange for permanent ownership by the library. However, with regard to electronic books, it appears that some arrangements allow libraries to subscribe to an e-book collection at a predetermined fee and for a predetermined interval of time. We are concerned with the format of the material, not the subscription or payment arrangement. These materials should be counted as books, not serial publications.



Sample E-Resource Cost Report Form

Figure C.1 (for C1-C3)

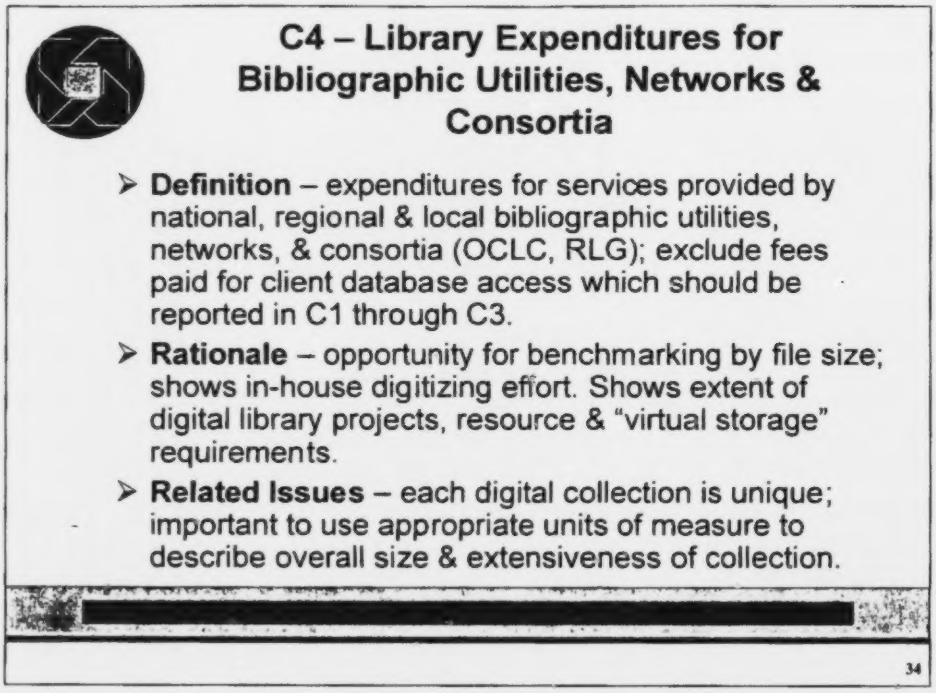
Reporting Period:______________

Name of Library:_______________

Resource/ Consortium Name and Type Full-text journals (1) Reference Sources (2) Electronic books (3)	Cost	Comments
Sub Total (1)		
Sub Total (2)		
Sub Total (3)		
Grand Total (1+2+3)		

[redacted]

BEST COPY AVAILABLE



C4 – Library Expenditures for Bibliographic Utilities, Networks & Consortia

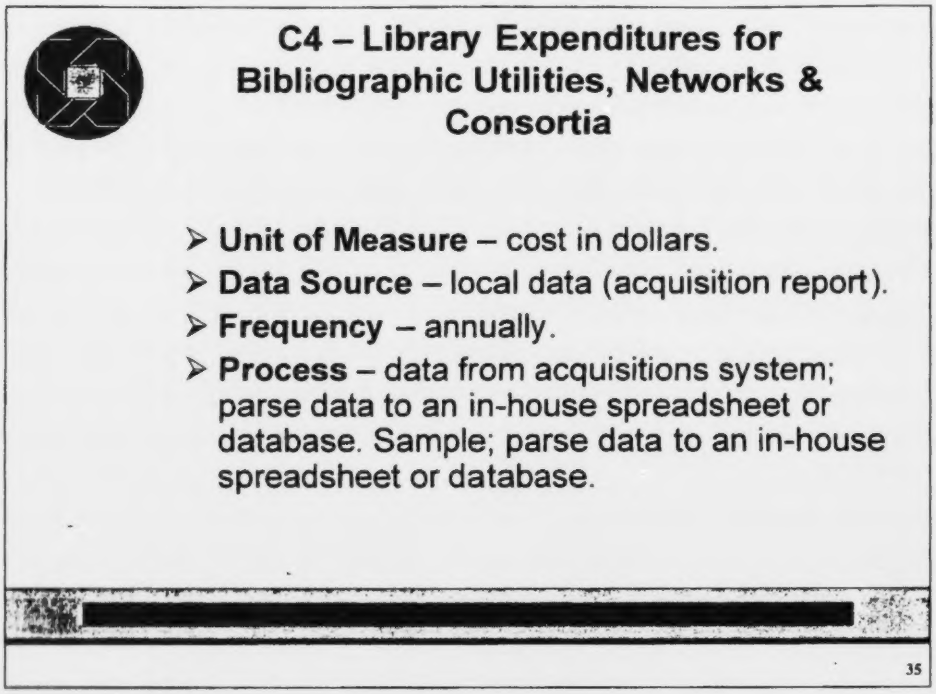
- **Definition** – expenditures for services provided by national, regional & local bibliographic utilities, networks, & consortia (OCLC, RLG); exclude fees paid for client database access which should be reported in C1 through C3.
- **Rationale** – opportunity for benchmarking by file size; shows in-house digitizing effort. Shows extent of digital library projects, resource & "virtual storage" requirements.
- **Related Issues** – each digital collection is unique; important to use appropriate units of measure to describe overall size & extensiveness of collection.

34

Definition: Expenditures paid by the library for services provided by national, regional, and local bibliographic utilities, networks, and consortia such as OCLC, RLG, *excluding fees paid for user database access and subscriptions*, which should be reported in C1 through C3.

Rationale: This statistic is based on the *ARL Supplementary Statistics* Survey. It was developed by ARL to determine how much money libraries spend for bibliographic utilities, networks, and consortia. Because individual libraries often have to deal with special provisions and funding issues related to contracts, this statistic may not lend itself to comparability among ARL member libraries. Nevertheless, it represents an attempt to keep track of the financial relationships between bibliographic utilities and libraries. Although this may provide very limited comparability, it is an estimate of the cost of bibliographic utilities, networks, and consortia.

Special considerations: Prorating can be time consuming. Consortia or other memberships may bring additional benefits, such as subscriptions, training, or preferential pricing for acquisition of materials. It may be difficult to separate pure membership fees from value-added services of membership (e.g., original catalog credits from OCLC that may be used to offset costs of databases, purchase of catalog records, etc.). Report the annual amount paid without prorating with the rationale that over the years the figures will even out.



C4 – Library Expenditures for Bibliographic Utilities, Networks & Consortia

- **Unit of Measure** – cost in dollars.
- **Data Source** – local data (acquisition report).
- **Frequency** – annually.
- **Process** – data from acquisitions system; parse data to an in-house spreadsheet or database. Sample; parse data to an in-house spreadsheet or database.

35

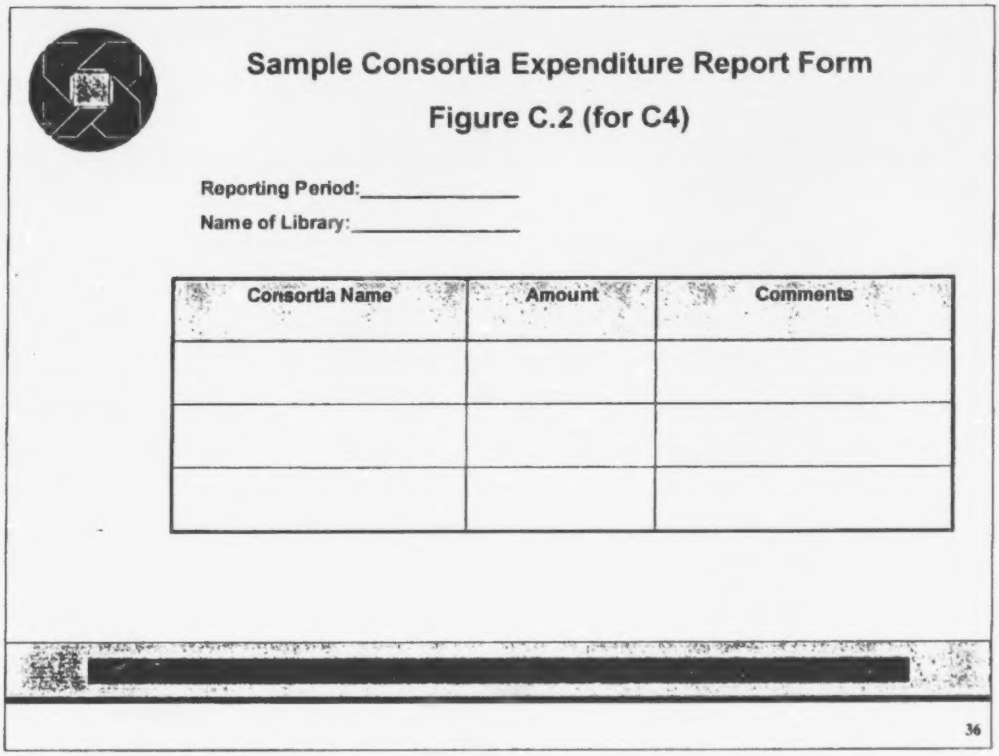
Implementation

Collected by: Local

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

Procedures:

- Gather reports and invoices with bibliographic utilities, networks, and consortia of which the library is a member for the whole or part of the reporting period. These documents are typically handled by the library's accounting office.
- Identify only those expenditures paid to the bibliographic utilities, networks, and consortia for membership, maintenance, and other infrastructure. Do not include expenditures that are directly attributable to access of electronic resources. Those expenditures should be included in C1 through C3. For instance, if your library paid a total of $100,000 to OCLC for its various services and your best guess of electronic database access portion of the services is 80%, then you should report $80,000 for C2 and the remaining $20,000 for C4.
- Even if a membership or consortium period is different from the reporting period, use the amount of the membership or consortium agreement.
- Use the sample form in Appendix C, Figure C.2 to compile the expenditures.



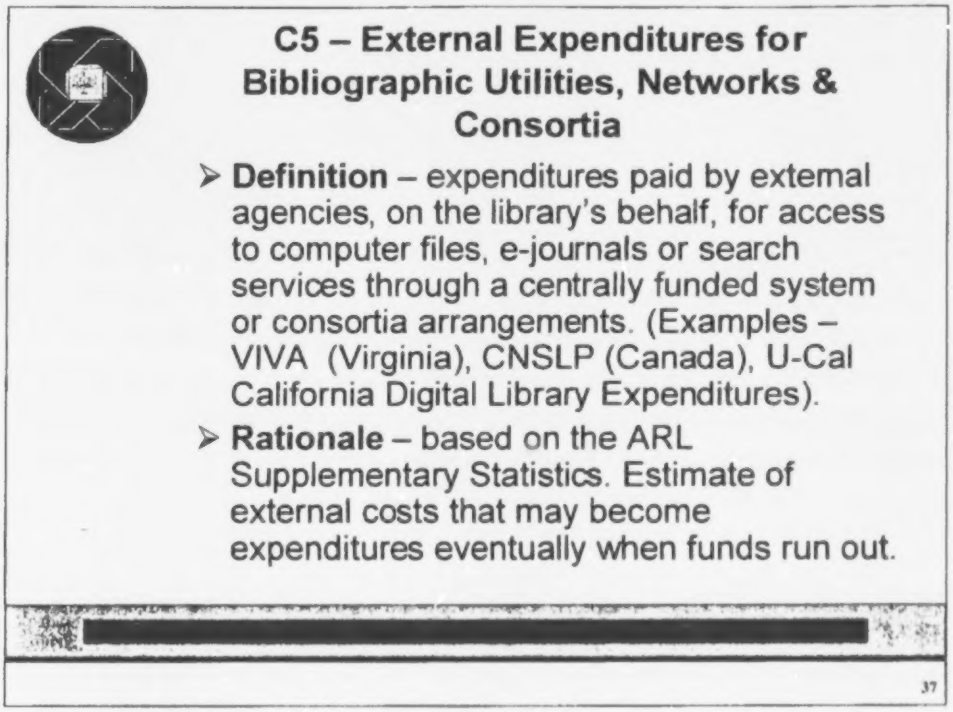
Sample Consortia Expenditure Report Form

Figure C.2 (for C4)

Reporting Period:________________

Name of Library:________________

Consortia Name	Amount	Comments

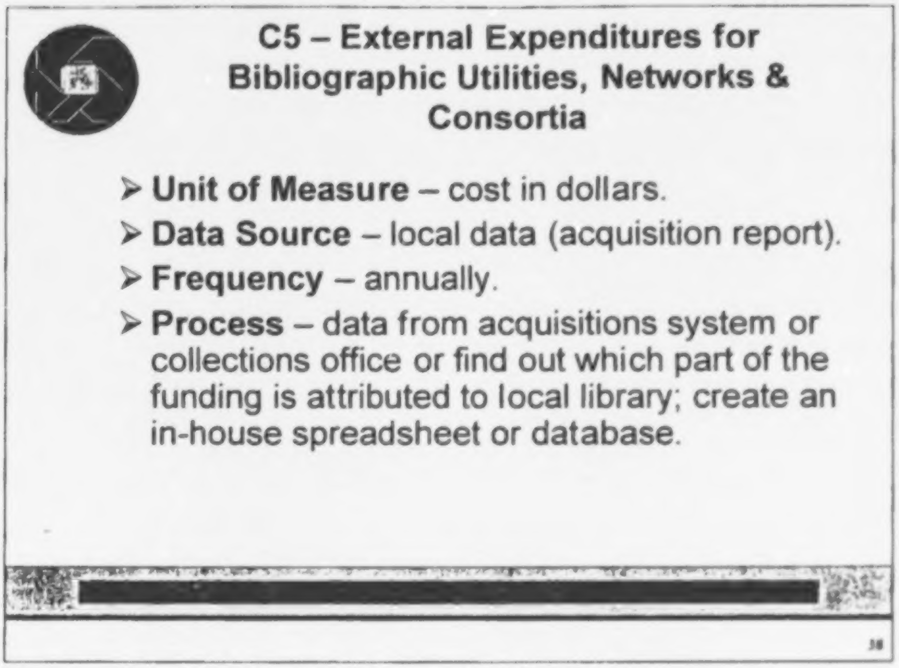


C5 – External Expenditures for Bibliographic Utilities, Networks & Consortia

- **Definition** – expenditures paid by external agencies, on the library's behalf, for access to computer files, e-journals or search services through a centrally funded system or consortia arrangements. (Examples – VIVA (Virginia), CNSLP (Canada), U-Cal California Digital Library Expenditures).
- **Rationale** – based on the ARL Supplementary Statistics. Estimate of external costs that may become expenditures eventually when funds run out.

Definition: Expenditures paid by external agencies, such as state government agencies, on the library's behalf for access to computer files, electronic serials, or search services through a centrally funded system or consortial arrangements. Examples include state- (or province-) supported networks such as VIVA (Virginia), CNSLP (Canadian National Site Licensing Project), and the University of California's California Digital Library Expenditure.

Rationale: Like statistic C4, this statistic is based on the *ARL Supplementary Statistics* Survey. It was developed by ARL to determine how much money is spent for bibliographic utilities, networks, and consortia on libraries' behalf for access to computer files, serials, and/or services through consortial arrangements. Because of contractual issues, this statistic may provide little comparability among ARL member libraries. Nevertheless, it can give ARL members an estimate of the external costs of bibliographic utilities, networks, and consortia.



C5 – External Expenditures for Bibliographic Utilities, Networks & Consortia

- **Unit of Measure** – cost in dollars.
- **Data Source** – local data (acquisition report).
- **Frequency** – annually.
- **Process** – data from acquisitions system or collections office or find out which part of the funding is attributed to local library; create an in-house spreadsheet or database.

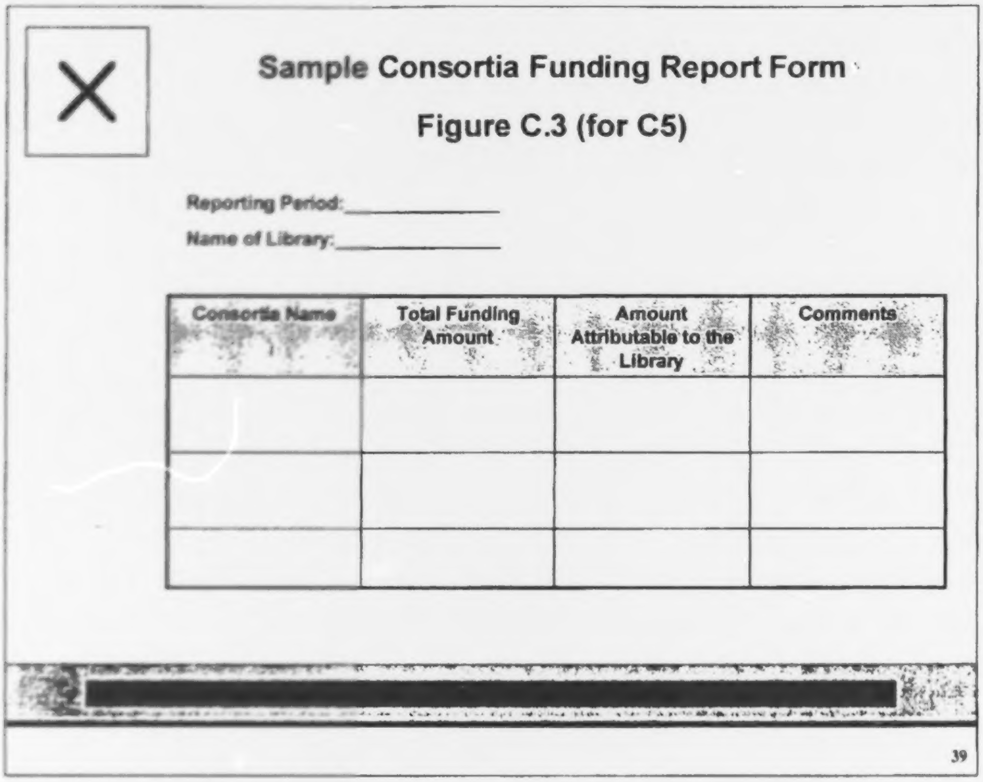
Implementation

Collected by: Local and external bodies such as regional and academic consortia

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly).

Procedures:

- Gather reports and invoices with bibliographic utilities, networks, and consortia that are related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office. However, they can be maintained outside the organization and, in some instances, may only be provided to libraries upon demand.
- Find out how much of the central funding is attributable to your library. For example, if your library contributes a total of $60,000 over a period of three years to a state consortium that has a matching contribution of $120,000 for the same period, the amount to report as C5 for a given year during the three-year period will be $40,000 ($120,000 x 1/3). The library's contribution ($60,000) has to be divided annually and posted in C1 through C3.
- If the specific dollar amount is not known, but the total student FTE for the consortium and the amount spent for the academic members are known, divide the overall amount spent by your institution's share of the total student FTE. Alternatively, if the consortium is comprised of different types of institutions (academic, public, or corporate), but the library has information about the portion of its own use among the consortium participants, multiply the total amount by the percentage of known (or estimated) usage rate.
- As a last resort, consult with a staff member overseeing the consortium or the central funding system to get an estimate of the portion of the central funding that is attributable to the library. Please make a note of this in the comments field in the sample worksheet (Appendix C, Figure C.3).
- Use the sample form in Appendix C Figure C.3 to compile the expenditures.



Sample Consortia Funding Report Form

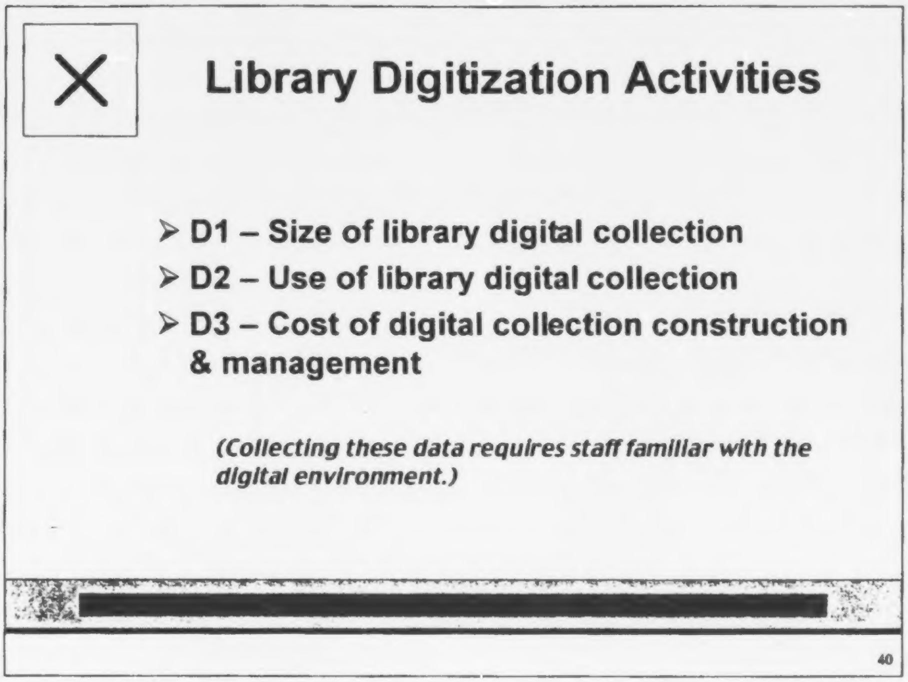
Figure C.3 (for C5)

Reporting Period:______________

Name of Library:______________

Consortia Name	Total Funding Amount	Amount Attributable to the Library	Comments

BEST COPY AVAILABLE



Library Digitization Activities

- ➢ D1 – Size of library digital collection
- ➢ D2 – Use of library digital collection
- ➢ D3 – Cost of digital collection construction & management

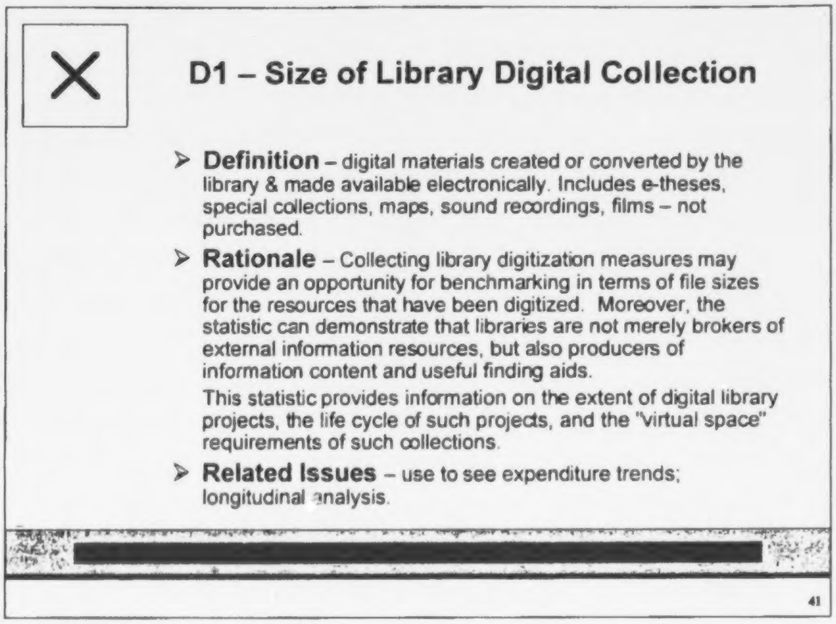
(Collecting these data requires staff familiar with the digital environment.)

4.3.4 Statistics Related to Library Digitization Activities

Comprised of resource and use measures, the digital collection measures attempt to describe where libraries are in creating and making available local (perhaps unique) content that may not have been previously accessible. Such collections can attract students and faculty to your university and thereby enhance the institution's reputation. As more libraries digitize resources, more users will be able to retrieve those unique resources at anytime and from anywhere. Digital library projects, as well as other network resources and services, also will serve increasing numbers of students taking courses online.

Collecting library digitization measures may provide an opportunity for benchmarking and may encourage libraries to devote more time and allocate more resources to this worthwhile endeavor. It should be noted that these statistics represent a very early attempt to measure digitization of resources; as time passes and the technology advances, some of the definitions and procedures may need to be revisited and modified. During the field-testing it was reported that storing and maintaining digitized resources had been an issue. The unavailability of an appropriate infrastructure in some institutions meant that the project did not include statistics related to library digitization projects.

Libraries archive the scholarly output of their institutions —theses and dissertations—in both paper and digital form. Digital collections also provide new opportunities with faculty to archive research results. These statistics, although preliminary, form a basis for tracking these issues.



D1 – Size of Library Digital Collection

- **Definition** – digital materials created or converted by the library & made available electronically. Includes e-theses, special collections, maps, sound recordings, films – not purchased.
- **Rationale** – Collecting library digitization measures may provide an opportunity for benchmarking in terms of file sizes for the resources that have been digitized. Moreover, the statistic can demonstrate that libraries are not merely brokers of external information resources, but also producers of information content and useful finding aids.

  This statistic provides information on the extent of digital library projects, the life cycle of such projects, and the "virtual space" requirements of such collections.
- **Related Issues** – use to see expenditure trends; longitudinal analysis.

Definition: Library digital collection refers to digital materials (texts, images, and audio-visuals) created in or converted from different formats (e.g., paper, microfilm, tapes, etc.) by the library and made available to users electronically. This includes electronic theses and dissertations (ETDs), special collections materials, maps, sound recordings, films, and other digital materials that are not purchased or acquired from outside through individual or consortial licensing agreements. Includes the number of titles and size (in gigabytes) by sub-categories (ETD, visual materials, texts, multimedia), and as an aggregate at the end of the reporting period. Also includes the number of items (titles) added during the reporting period.

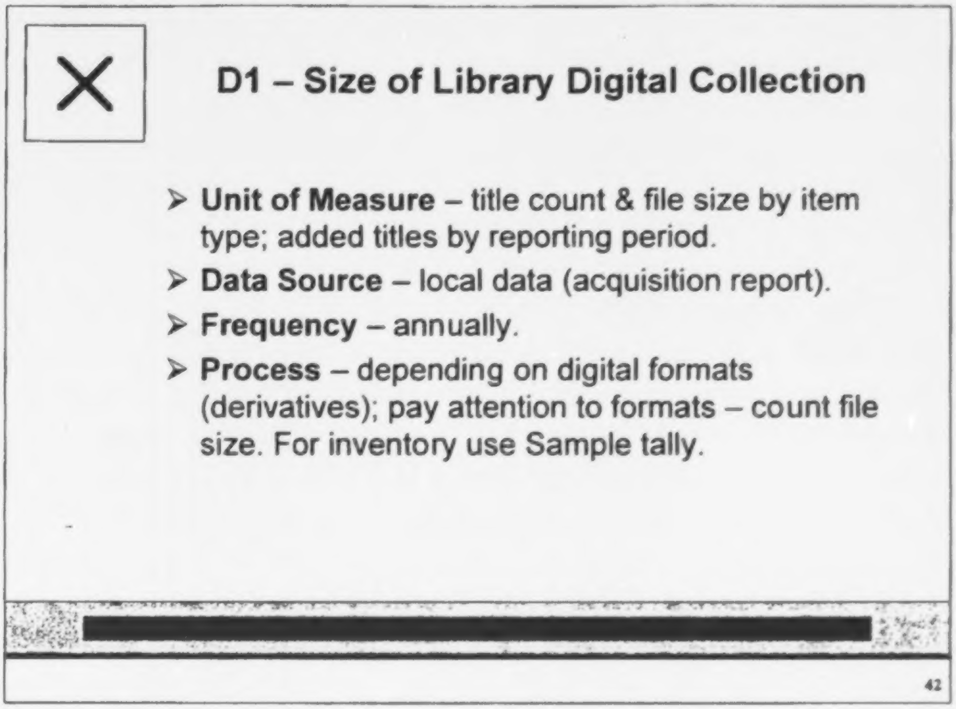
The types of formats in Appendix C, Figure C.4, refer to original formats rather than the digitized outputs. Examples of visual materials include photos, maps, and postcards. Examples of text include books, journal articles, and pamphlets. Examples of multimedia include audio, video, and other interactive materials. However, this statistic does not include any back up copies or mirror sites because items should be counted only once.

Rationale: Collecting library digitization measures may provide an opportunity for benchmarking in terms of file sizes for the resources that have been digitized. Moreover, the statistic can demonstrate that libraries are not merely brokers of external information resources, but also producers of information content and useful finding aids.

This statistic provides information on the extent of digital library projects, the life cycle of such projects, and the "virtual space" requirements of such collections.

Related issues: Realistically, each digital collection is unique in terms of the production process, the way it is intended to be used, its focus, and maintenance. It is important to use appropriate units of measurement to describe the overall size and extensiveness of the whole collection.

Because of the wide variations of the types and features of digital collections constructed at ARL institutions, this statistic may be more useful locally than for comparison across ARL member libraries. Benchmarking may, however, be possible from the data collected to produce some qualitative and quantitative indicators as to the extent of digital library collection activities and different emphases across the ARL membership.



D1 – Size of Library Digital Collection

- **Unit of Measure** – title count & file size by item type; added titles by reporting period.
- **Data Source** – local data (acquisition report).
- **Frequency** – annually.
- **Process** – depending on digital formats (derivatives); pay attention to formats – count file size. For inventory use Sample tally.

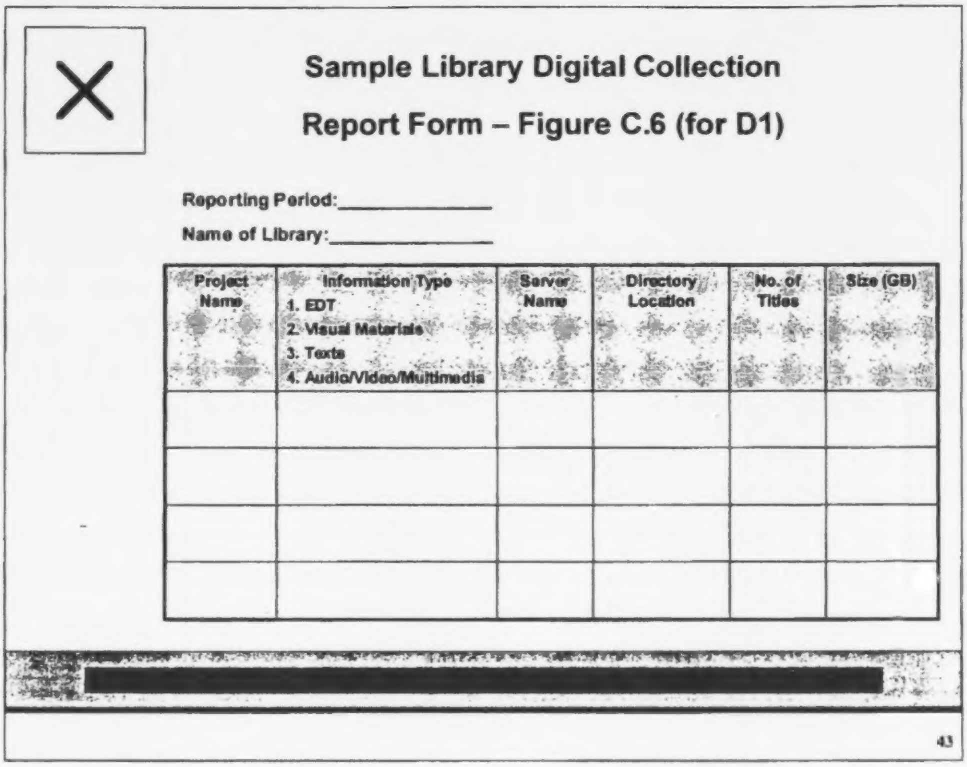
Implementation

Collected by: Local

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

Procedures: For cases in which multiple digital formats (derivatives) were produced from an item, count it only once based on the type of item that was digitized. For example, if a 100-page book was digitized in 100 TIFF files, each containing a page, a 100-page PDF file, and 10 PDF files (one PDF file for each of 10 chapters), count it as a single text with 100 pages. If a derivative item was used as the source, do not count the outputs. But in the total size (in gigabytes) include all versions of derivatives.

- Designate a staff member to coordinate the collection of this statistic. The person should be well aware of library digital collection activities.
- Identify library staff in charge of various digital library projects and initiatives.
- It is necessary to conduct an inventory of digital material stock using the sample tally worksheet in Appendix C, Figure C.6 if it has not been done already. If this inventory information is already available, enter it into the worksheet. When the inventory is completed, summarize the information using the sample worksheet in Appendix C, Figure C.4. Add additional categories if necessary.
- After obtaining the inventory information, ask staff members to keep track of additional output regularly using the sample tally worksheet in Appendix C, Figure C.6.
- At the end of the reporting period, collect the worksheets and calculate the total production during the reporting period using the worksheet in Appendix C, Figure C.5. Add additional categories if necessary.



Sample Library Digital Collection

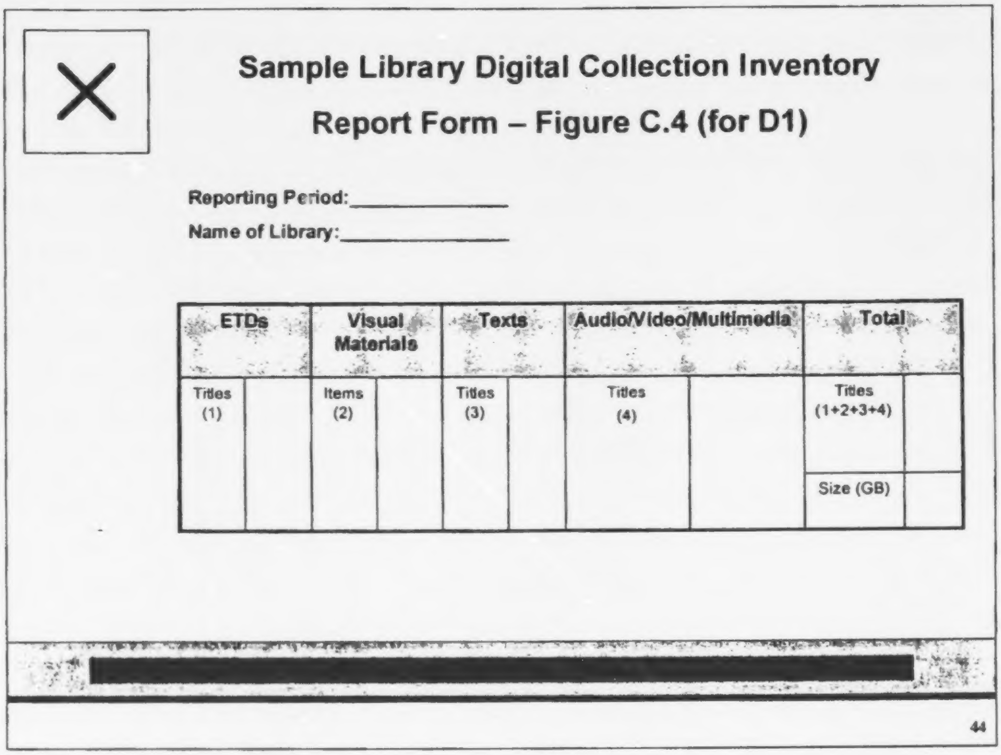
Report Form – Figure C.6 (for D1)

Reporting Period:______________

Name of Library:_______________

Project Name	Information Type 1. EDT 2. Visual Materials 3. Texts 4. Audio/Video/Multimedia	Server Name	Directory Location	No. of Titles	Size (GB)

BEST COPY AVAILABLE

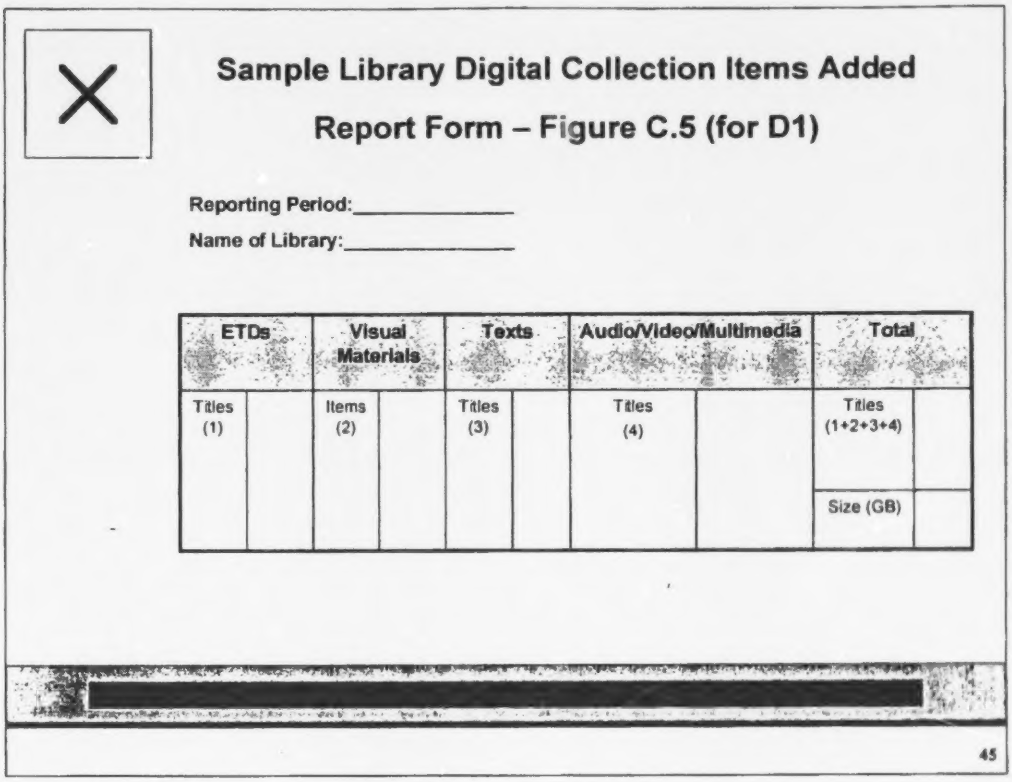


Sample Library Digital Collection Inventory Report Form – Figure C.4 (for D1)

Reporting Period:______________

Name of Library:______________

ETDs		Visual Materials		Texts		Audio/Video/Multimedia		Total	
Titles (1)		Items (2)		Titles (3)		Titles (4)		Titles (1+2+3+4)	
								Size (GB)	



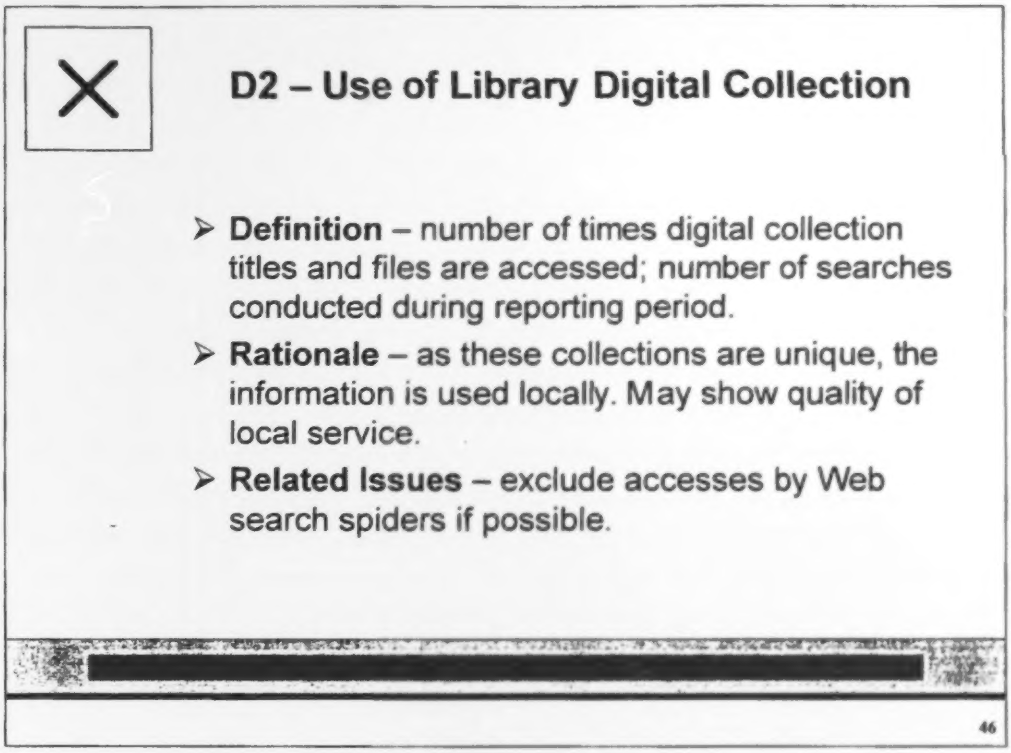
Sample Library Digital Collection Items Added Report Form – Figure C.5 (for D1)

Reporting Period:______________

Name of Library:______________

ETDs		Visual Materials		Texts		Audio/Video/Multimedia		Total	
Titles (1)		Items (2)		Titles (3)		Titles (4)		Titles (1+2+3+4)	
								Size (GB)	

BEST COPY AVAILABLE



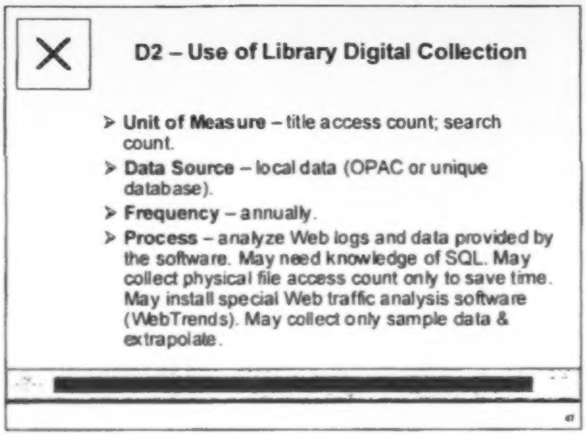
D2 – Use of Library Digital Collection

- **Definition** – number of times digital collection titles and files are accessed; number of searches conducted during reporting period.
- **Rationale** – as these collections are unique, the information is used locally. May show quality of local service.
- **Related Issues** – exclude accesses by Web search spiders if possible.

Definition: Number of times library digital collection titles and physical files were accessed and the number of searches (queries) conducted (if there is such a capability) during the reporting period.

Rationale: Each digital collection is unique in terms of its focus, production process, and the ways it is intended to be used and maintained. Therefore, because of the wide variations of the types and features of these library collections constructed at different ARL institutions, this statistic needs to be collected and used locally instead of across ARL member libraries. Nevertheless, this statistic has the potential to produce some qualitative and quantitative indicators as to how these collections are being used and serving the intended user community's needs.

Related issues: This statistic needs to be collected and used locally instead of across ARL member libraries because of the wide variations of the types and features of digital collections constructed at ARL institutions.



D2 – Use of Library Digital Collection

- **Unit of Measure** – title access count; search count.
- **Data Source** – local data (OPAC or unique database).
- **Frequency** – annually.
- **Process** – analyze Web logs and data provided by the software. May need knowledge of SQL. May collect physical file access count only to save time. May install special Web traffic analysis software (WebTrends). May collect only sample data & extrapolate.

Implementation

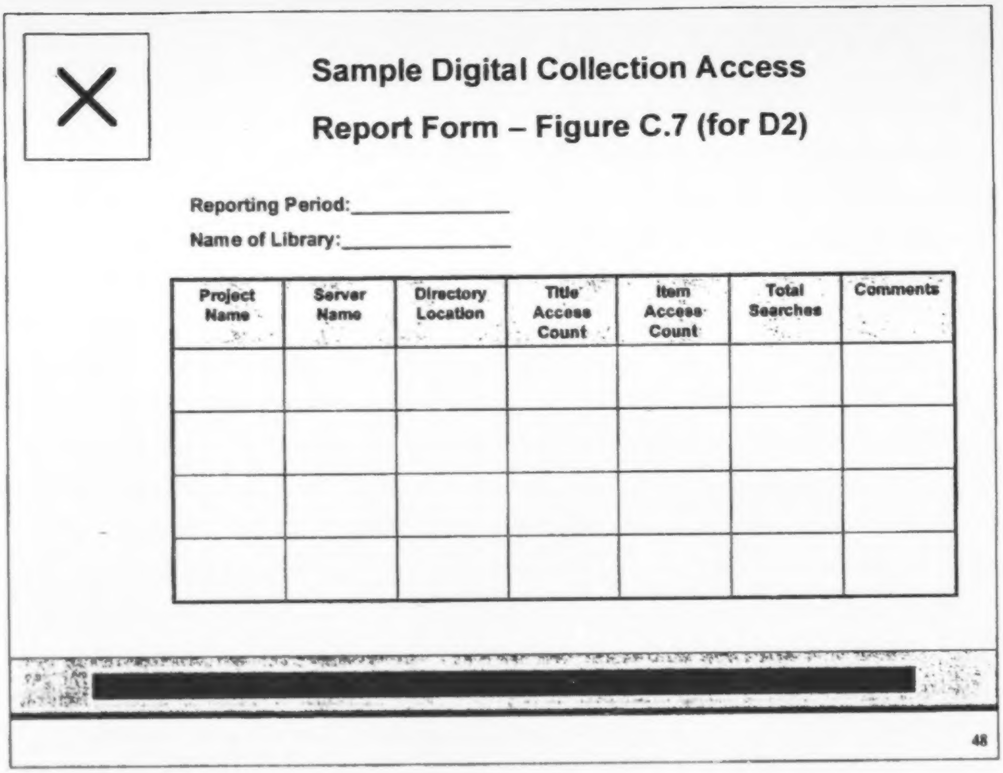
Collected by: Local

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

Procedures:

- Designate a staff member to coordinate the collection of this statistic. The person should be well versed in the use of Web log software and/or statistics provided by the software. This person will act as a liaison for staff members who are responsible for managing library digital collections. Obtaining the statistic may require some level of programming (e.g., Unix scripting and SQL).
- Items accessed can be collected in various ways, and depending on your library's environment, your library may need to collect different access statistics.
- Although you are asked to collect both title access and physical file access, if it takes too much time and effort to collect the title access, report the physical file access count only. For example, a book can be digitized and made into 10 PDF files, each containing a chapter, for access. Suppose a user viewed five PDF files out of 10. In this case, you will have five physical item accesses and one title access. Usually it is easier to have a physical item access count, while it takes custom programming to compute the title access count as most off-the-shelf Web traffic software packages do not provide this.
- Do not report Web page hits. Instead, count how many times the digitized items were accessed (the exact name for item access may vary depending on the type of Web traffic analysis software being used in the library).
- If a search capability is a feature of a library digital collection, the total number of searches submitted needs to be collected. A search represents an explicit user request for specific information in a database and is expressed usually in the form of word strings. Clicks on Web page buttons, such as "Next" and "Previous," do not count as user searches.
- You might want to install Web traffic analysis software (e.g., WebTrends, Web Tracks) on the library Web servers housing library digital collection materials, if the Web servers do not have such software already. You might want to consider installing a trial version that gives between 30-180 days of free trial.
- Read the description of reported statistics carefully and make sure that the software provides what you want.
- If continuous collection of use statistics is not possible or desirable, select a typical week (or month) to run a sample study. Be sure to vary the specific week (or month) chosen over the course of a year or from year to year to account for seasonal fluctuations. Extrapolate based on the sample data.
- At the end of the report period, use the log analysis report to calculate the number of accesses to library digital collection items. Use the sample report in Appendix C, Figure C.7, to organize the information.

Special considerations: To the extent possible, exclude accesses by Web search spiders. Also, do not include accesses to auxiliary (or incidental) items that are not part of the library digital collection content (.gif buttons and image maps for navigation). Note the method used and include a description of any filtering done.

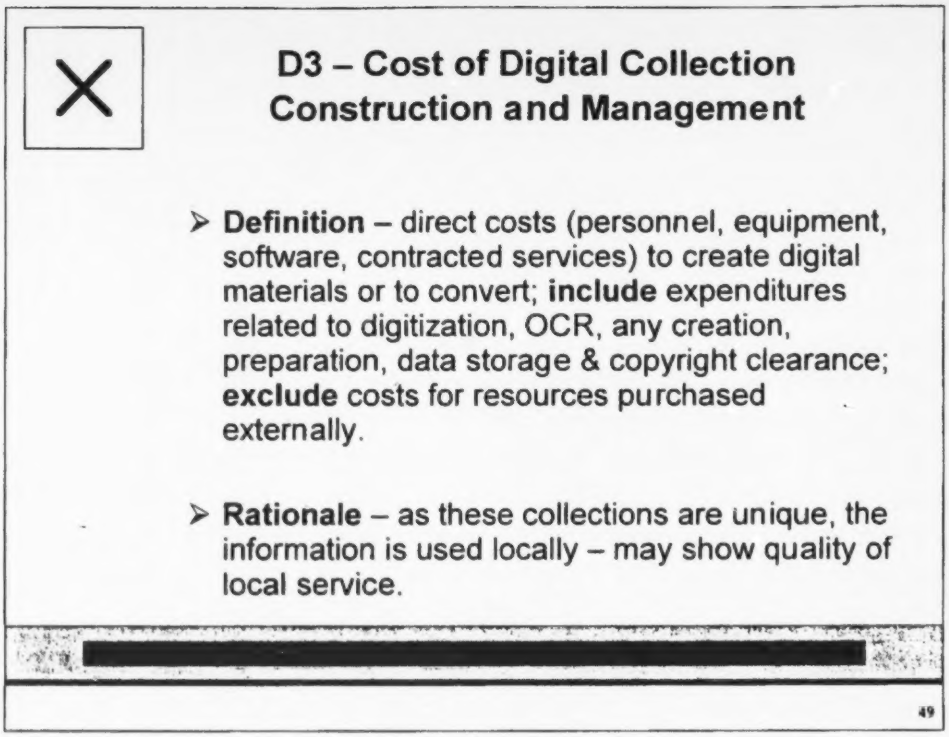


Sample Digital Collection Access Report Form – Figure C.7 (for D2)

Reporting Period:_______________

Name of Library:_______________

Project Name	Server Name	Directory Location	Title Access Count	Item Access Count	Total Searches	Comments



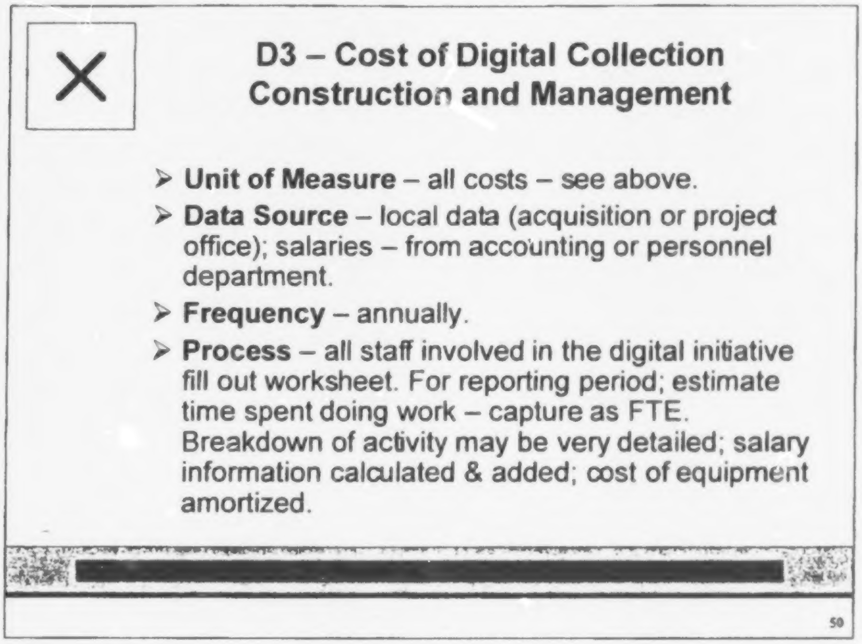
D3 – Cost of Digital Collection Construction and Management

- **Definition** – direct costs (personnel, equipment, software, contracted services) to create digital materials or to convert; **include** expenditures related to digitization, OCR, any creation, preparation, data storage & copyright clearance; **exclude** costs for resources purchased externally.
- **Rationale** – as these collections are unique, the information is used locally – may show quality of local service.

Definition: Annual direct costs (personnel, equipment, software, contracted services, and similar items) spent to create digital materials (texts, images, and multimedia) or to convert existing materials into digital form for the purpose of making them electronically available to users. Include expenditures related to digitization, OCR, editorial, creation of markup texts, preparation of metadata for access to digitized materials, data storage, and copyright clearance. Exclude expenditures for information resources purchased or acquired from outside the institution through individual or consortial licensing agreements.

Rationale: The cost of each digital collection construction may vary significantly, depending on the size of the collection, conditions of the sources before digitizing, available infrastructure, staff allocation, timeline, and administrative support. This statistic should be collected and used locally instead of across ARL member libraries because of the wide variability among these library collections constructed at different ARL institutions. Nevertheless, this statistic has the potential to provide quantitative indicators as to how costly these efforts are, how much resource allocation (i.e., budget allocation, staffing, infrastructure, etc.) is needed, and how well they serve the intended user community's needs (e.g., to account for internal and external costs to construct and manage digital collections at ARL libraries).

Related issues: This statistic needs to be collected and used locally instead of across ARL member libraries because of the wide variations of the types and features of digital collections constructed at ARL institutions.



D3 – Cost of Digital Collection Construction and Management

- **Unit of Measure** – all costs – see above.
- **Data Source** – local data (acquisition or project office); salaries – from accounting or personnel department.
- **Frequency** – annually.
- **Process** – all staff involved in the digital initiative fill out worksheet. For reporting period; estimate time spent doing work – capture as FTE. Breakdown of activity may be very detailed; salary information calculated & added; cost of equipment amortized.

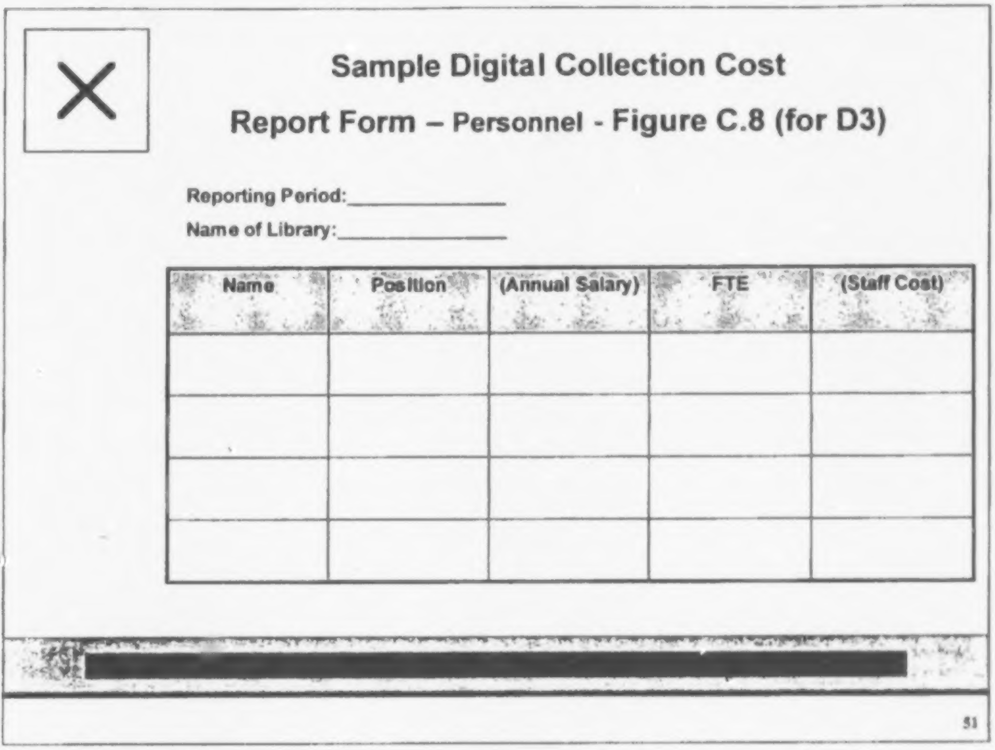
Implementation

Collected by: Local

Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

Procedures:

- Designate a staff member to coordinate the collection of this statistic.
- Direct the designated staff member to contact library staff members who are in charge of digital collection projects. Ask all library staff members involved in any digital collection projects as part of their official responsibilities to fill out the worksheet in Appendix C, Figure C.8, for the reporting period. Ask them to estimate how much of their time was spent on planning, implementing, and managing digital collection projects. This information will be entered in the worksheet as FTE (full-time equivalent). A further breakdown of activities may be necessary if the library wants to have more detailed information on the distribution of efforts.
- Note that annual salary should not be asked of the staff members filling out the worksheet and should not include fringe benefits. When all the worksheets are collected, the salary information will be obtained from the library accounting or personnel department. Direct staff cost will then be calculated.
- The personnel cost should also include wages paid to non-salaried staff, including student and other hourly workers.
- Cost of equipment should be amortized. For example, if a $3,000 scanner was purchased at the beginning of the reporting year and has a depreciation period of three years, register $1,000 as the equipment cost. Costs of software should be reflected in full amounts based on the time of the purchase.
- If a subcontracting period is different from the reporting period, prorate the amount for the reporting period. If the payment is based on percent to completion, include only the amount that belongs to the reporting period.
- Use the sample worksheet in Appendix C, Figure C.9, to calculate the total cost.



Sample Digital Collection Cost Report Form – Personnel - Figure C.8 (for D3)

Reporting Period:______________

Name of Library:______________

Name	Position	(Annual Salary)	FTE	(Staff Cost)

51

BEST COPY AVAILABLE

Sample Digital Collection Cost Report Form - Figure C.9 (for D3)

Reporting Period:______________

Name of Library:______________

Project Name	Expense Type	Amount
Project (name) Total		
Project (name) Total		
Library Total		

372

ASSOCIATION OF RESEARCH LIBRARIES
WASHINGTON, D.C.
2002

MEASURES FOR ELECTRONIC RESOURCES (E-METRICS)

PART 4

Data Collection Manual for Academic and Research Library Network Statistics and Performance Measures

Wonsik "Jeff" Shim, Charles R. McClure,
Bruce T. Fraser, John Carlo Bertot

DECEMBER 2001

INFORMATION USE
MANAGEMENT AND
POLICY INSTITUTE

School of Information Studies
Florida State University
Tallahassee, Florida 32306-2100
http://www.ii.fsu.edu

ASSOCIATION OF RESEARCH LIBRARIES
WASHINGTON, DC

ARL

ASSOCIATION OF RESEARCH LIBRARIES

...shaping and influencing forces affecting the future of research libraries in the process of scholarly communication

Copyright © 2001 Association of Research Libraries

To order more copies of this manual, contact
ARL Publications Distribution Center
P.O. Box 531
Annapolis Junction, MD 20701-0531

Telephone: (301) 362-8196
Fax: (301) 206-9789
Email: pubs@arl.org

BEST COPY AVAILABLE

Preface

This manual provides definitions, data collection procedures, and discusses related issues pertaining to interpreting and using the recommended statistics and measures. The definitions and procedures were derived from a month of field-testing at more than a dozen ARL libraries. The statistics and performance measures represent a minimum set of data that need to be collected continually and used. Individual libraries will need to develop local procedures to support data collection activities within the guidelines of this manual. However, readers need to recognize that the statistics and measures will be refined and extended continually in the future. PowerPoint instructional modules to accompany this manual are available from ARL.

Table of Contents

Acknowledgements i
Introduction iii
Recommended Statistics and Measures 2
  Network Statistics 2
  Performance Measures 2
Criteria for Performance Statistics and Measures 3
Data Collection Procedures for Performance Statistics and Measures 5
  STATISTICS RELATED TO PATRON ACCESSIBLE RESOURCES 5
  Patron Accessible Electronic Resources 5
    R1 Number of electronic full-text Journals 5
    R2 Number of electronic reference sources 7
    R3 Number of Electronic Books 8
Use of Electronic Networked Resources and Services 11
  Use of Networked Resources and Services 11
    U1 Number of electronic reference transactions 11
    U2 Number of logins (sessions) to electronic databases 13
    U3 Number of queries (searches) in Electronic Databases 14
    U4 Items requested in electronic databases 15
    U5 Virtual visits to library's website and catalog 16
Expenditures for Electronic Resources and Related Infrastructure 19
  GENERAL INTRODUCTION TO C1-C3 19
  Expenditures for Networked Resources and Related Infrastructure 20
    C1 Cost of electronic full-text journals 20
    C2 Cost of electronic reference sources 21
    C3 Cost of electronic books 22
    C4 Library expenditures for bibliographic utilities, networks and consortia 24
    C5 External expenditures for bibliographic utilities, networks, and consortia 25
Statistics Related to Library Digitization Activities 27
  Library Digitization Activities 27
    D1 Size of Library digital collection 27
    D2 Use of library digital collection 29
    D3 Cost of digital collection construction and management 30
Analysis of Suggested Performance Measures 33
  Performance Measures 33
    P1 Percentage of Electronic Reference Transactions of Total Reference 33
    P2 Percentage of Virtual Library Visits of All Library Visits 34
    P3Percentage of Electronic Books to All Monographs 35
Improving Networked Statistics 37
Appendices 39
  APPENDIX A: LIST OF STATISTICS CONSIDERED 40
  APPENDIX B: FORMS 41

Acknowledgments

The need for
electronic and netw
Libraries is signific
report provide an in
electronic and netw

cedures for selected
n of Research
es described in this
and impacts from

The report cou
of a number of indi
acknowledge the 24
project:

thout the assistance
eam wishes to
ve supported the

light TITLE
he side page
KNOWLEDGEMENTS
ADY HAVE PRINTED
GOOD ABOVE .

University of Alb
Auburn Universit
University of Con
University of Illin
University of Mar
Park
University of Nebraska-Lincoln
University of Pennsylvania
University of Pittsburgh
University of Southern California
Virginia Polytechnic Institute and State University
University of Wisconsin-Madison
Library of Congress

ersity
go
oba
chusetts
University of Notre Dame
Pennsylvania State University
Purdue University
Texas A&M University
University of Western Ontario
Yale University
New York Public Library, The Research Libraries

At each of these libraries, liaisons and other individuals assisted the study team by providing input and suggestions to earlier drafts, by field-testing the statistics and measures, and by attending a number of meetings and discussions regarding the content of the report. We are deeply indebted to these organizations, the directors, the liaisons, and others at those organizations that participated directly in the project.

We also want to acknowledge the participation and assistance from a number of data base vendors and providers who participated in various meetings and discussions to help develop operational definitions procedures for these statistics and measures. These include:

Academic Press/IDEAL
Elsevier/ScienceDirect
Lexis-Nexis
Ovid
Bell & Howell
Gale Group
netLibrary
SilverPlatter
EBSCO
JSTOR
OCLC/FirstSearch

BEST COPY AVAILABLE

Their involvement in the project demonstrates the interest and concern they have for standardizing some of the statistics and working with the library community to achieve this goal. We look forward to continuing our work with them in the future.

From the Association of Research Libraries we especially want to thank the assistance of Martha Kyrillidou, Lee Anne George, and Duane Webster. Their advice, suggestions, handling of logistics for meetings, etc., was instrumental in helping the study team complete the project. We especially appreciate their commitment to the study and their direct consultation and input throughout the development of this report.

We especially wish to acknowledge the leadership of Carla Stoffle, Dean of Libraries at the University of Arizona and Chair of the ARL Statistics and Measurement Committee. She has been a significant force in moving the New Measures Initiative forward. Rush Miller, University Librarian and Director, University of Pittsburgh Library System, and Sherrie Schmidt, Dean of Libraries at Arizona State University, have provided extraordinary leadership in supporting this part of the New Measures agenda that deals with measures for electronic resources, E-Metrics. This project will not have been possible without their dedication, financial and moral support; Rush and Sherrie have made it possible to explore E-Metrics within the framework of the ARL New Measures Initiative, have actively encouraged the community to engage in these issues, and helped ARL move forward experimenting in this area.

We also would like to thank Priscilla Caplan and Michele Newberry at the Florida Center for Library Automation (FCLA) for their thoughtful reviews of the field-testing instructions. Bonnie Gratch-Lindauer, Coordinator of Library Instructional Services at the City College of San Francisco Rosenberg Library, has contributed significantly to the outcomes focus with her analysis of accreditation standards.

Other individuals at other organizations, such as Denise Davis at the National Commission on Library and Information Science (NCLIS), Sue Phillips from the International Consortium of Library Consortia (ICOLC), and Pat Harris from the National Information Standards Organization, also contributed their time and ideas to material in this report.

We also gratefully acknowledge the suggestions from a number of study participants. They provided the study team with excellent suggestions for improving the report. The report is clearly a stronger publication as a result of their comments and suggestions.

Finally, we would like to acknowledge the substantial contributions of other staff members at the Information Use Management and Policy Institute: Don L. Latham, Senior Research Associate, Assistant Dean and Assistant Professor, FSU School of Information Studies; Benjamin Keith Belton, Senior Research Associate, Assistant Professor, FSU School of Information Studies; Arif Dagli, Research Associate; Emily H. Leahy, Research Associate; and Linda Carruth, Research Associate. Without their efforts and insights over the course of the E-Metrics project, this Data Collection Manual would not be nearly as beneficial as we hope it will be.

Introduction

There is a critical need for academic and research libraries to develop new statistics and measures to describe network services and resources. This manual is one product of a larger New Measures Initiative by the Association of Research Libraries (ARL) <http://www.arl.org/stats/newmeas/newmeas.html>. The E-Metrics project that developed this manual is funded by a group of 24 ARL member libraries.

Based on a substantial field-testing process (described in detail in the E-Metrics Phase II report <http://www.arl.org/stats/newmeas/emetrics/>), the study team recommends a number of network statistics and performance measures that provide indicators of library networked services and resources.

For a host of reasons not explored in this manual, the final set of statistics and measures were selected among others that were considered but not discussed in detail herein. The selection of certain measures over others is not meant to imply that those not selected are flawed or have no beneficial use. See Appendix A for a table containing three lists of candidate measures considered during the E-Metrics project, and refer to Part 2 of the E-Metrics Phase II Report for a discussion of the evolution of measures.

These statistics and measures will provide research libraries with an important and useful set of tools to describe and assess network resources and services. The manual also provides libraries with guidance regarding the use to which the network statistics and measures can be put.

The manual offered here has a number of specific goals and objectives. Its primary goal is to provide a beginning approach for research libraries to better describe the use and users of their networked services. A secondary goal is to increase the visibility and importance of developing such statistics and measures. Specific objectives of the manual are to:

- ❒ Identify selected key statistics and measures that can describe use and users of electronic and networked services;
- ❒ Standardize procedures and definitions to collect these statistics and measures; and
- ❒ Increase awareness of selected issues related to collecting, analyzing, and reporting the data to produce these statistics and measures.

The statistics and measures offered here will need to be continually developed, expanded, refined, and possibly eliminated over time.

A key component of the project has been to work with vendors and other organizations regarding the collection, manipulation, and reporting of vendor-supplied online database data. Many of the statistics described here resulted from the cooperative efforts among these vendors and other national/international groups interested in developing such statistics. Such efforts should be continued.

Given the rapidly changing technology environment, the changing milieu of higher education, changing organizational structures within ARL libraries, and the complexity of measuring such networked services, it is almost certain that the statistics and measures proposed in this manual will continue to evolve. These measurement tools, however, will provide research librarians with important techniques to count, describe, and report networked services and resources in their libraries.

381

Data Collection Manual for Academic and Research Library Network Statistics and Performance Measures

Recommended Statistics and Measures

Network Statistics

Patron Accessible Electronic Resources

☐ R1 Number of electronic full-text journals (p. 5)
☐ R2 Number of electronic reference sources (p. 7)
☐ R3 Number of electronic books (p. 8)

Use of Networked Resources and Services

☐ U1 Number of electronic reference transactions (p. 11)
☐ U2 Number of logins (sessions) to electronic databases (p. 13)
☐ U3 Number of queries (searches) in electronic databases (p. 14)
☐ U4 Items requested in electronic database (p. 15)
☐ U5 Virtual visits to library's website and catalog (p. 16)

Expenditures for Networked Resources and Related Infrastructure

☐ C1 Cost of electronic full-text journals (p. 20)
☐ C2 Cost of electronic reference sources (p. 21)
☐ C3 Cost of electronic books (p. 22)
☐ C4 Library expenditures for bibliographic utilities, networks, and consortia (p. 24)
☐ C5 External expenditures for bibliographic utilities, networks, and consortia (p. 25)

Library Digitization Activities

☐ D1 Size of library digital collection (p. 27)
☐ D2 Use of library digital collection (p. 29)
☐ D3 Cost of digital collection construction and management (p. 30)

Performance Measures

Performance Measures

☐ P1 Percentage of electronic reference transactions of total reference (p. 33)
☐ P2 Percentage of virtual library visits of all library visits (p. 34)
☐ P3 Percentage of electronic books to all monographs (p. 35)

BEST COPY AVAILABLE

Criteria for Performance Statistics and Measures

The data collection procedures for the statistics and performance measures are defined and described according to the following criteria:

Definition: Describes each statistic or performance measure.

Rationale: Discusses why the suggested statistic or performance measure is needed and/or how it can be useful to describe electronic resources and services.

Implementation: Provides instructions for implementing the identified statistic or performance measure, categorized by collector, frequency, procedures, and special considerations, if any.

Collected by: Identifies who is responsible for collecting data; *local* refers to the individual library and *vendors* refers to the content providers with whom the library has contracted to provide electronic resources.

Frequency: Identifies how often the statistic/measure needs to be collected.

Procedures: Outlines the manner in which the data for a statistic or performance measure may be collected. Also includes recommendations for forms.

Special considerations: Identifies special factors that need to be considered during data collection or interpretation.

Related issues: Discusses issues that go beyond the suggested data collection procedures, such as the availability of complementary statistics, ways in which statistics can be combined with other statistics, and other possible approaches to data collection.

BEST COPY AVAILABLE

Data Collection Procedures for Performance Statistics and Measures

Statistics Related to Patron Accessible Resources

The statistics developed for patron accessible resources account for networked resources and services. The current ARL membership criteria index lacks separate measures for electronic and networked monographs, serials, and bibliographic utilities. Though these electronic and networked resources may limit the amount of print materials acquired and may cost more than their print counterparts, they do constitute more widely available resources.

In the electronic and networked realm, the more a library has, the more materials are provided to customers anytime and anywhere. Although local needs and available resource allocations may differ from library to library, the resource statistics allow academic research libraries to see and to demonstrate to others the changing nature of library collections over the years. In turn, the libraries are expected to use them to make decisions about resource allocations (budget, staff, time, etc.) and to undertake strategic planning accordingly. Furthermore, the picture of available resources provides libraries with an opportunity to offer valued services. However, because the evolving nature of these statistics will rely heavily on technological enhancements, all libraries are encouraged to use extra caution while serving their institutional goals, missions, and visions.

☐ R1 Number of electronic full-text journals
☐ R2 Number of electronic reference sources
☐ R3 Number of electronic books

Patron Accessible Electronic Resources

R1 NUMBER OF ELECTRONIC FULL-TEXT JOURNALS

Definition: Number of electronic full-text journal subscriptions that the library provides to users either through an individual institutional licensing contract with the provider of journals or through other arrangements (e.g., regional or state consortium) for which the library pays a reduced or no fee for access.

The full-text journals should provide both search and browse capabilities by title and issue. This is different from journal article databases, such as Expanded Academic ASAP in INFOTRAC, that do not provide browsing capability.

This includes electronic full-text journals offered by established scholarly journal publishing houses (e.g., Elsevier's ScienceDirect and Academic Press's IDEAL), scholarly societies (e.g., American Chemical Society journals and American Institute of Physics Online), and services which aggregate content from smaller publishers or from those publishers that prefer to use an external delivery platform (Highwire, OCLC ECO, and EbscoOnline). This should exclude general-purpose periodicals such as magazines and newspapers.

Rationale: Electronic access has expanded dramatically to provide a range of useful resources for library users. This statistic helps document the degree of expansion of electronic resource availability in the individual library and can be used to justify continuation and enhancement of these services.

Research libraries act increasingly as gateways to a vast array of external information. This measure specifically addresses the extensiveness of scholarly content a library provides to its user community. In many cases, electronic access enables the library to offer larger selections of journals than it could provide in paper format. This statistic can also be used for library promotion and internal and external reporting. Particularly, this statistic aims at showing the changing nature of traditional scholarly resources with improved and better access anytime and anywhere.

Implementation

☐ Collected by: Local and vendors

☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

☐ Procedures: It is impossible to obtain the complete list of electronic full-text journals from a single source. Possible sources for the information include library catalog records (those records that point to web addresses), library web pages that list the journal titles, the internal electronic resource management database, and vendor records (websites and contract documentation).

1. Create a master list of full-text electronic journals from all the sources available. Use a spreadsheet or database program to organize and maintain the list.
2. Remove titles that do not meet the above-mentioned definition but keep duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
3. Record the counts and be sure they are updated regularly. The library should also update the count information on the library website and/or in marketing brochures on a regular basis.

Special considerations: It is time-consuming to establish procedures to collect this statistic for the first time. However, once that is done, it will be relatively easy to update the information. (This applies to other statistics and measures included in the manual as well.)

Include journal titles that come with print subscriptions or print plus online subscriptions since the focus of the statistic has to do with how many scholarly electronic journal titles users can access. Do not include free government publications and free electronic journals to which the library provides links.

Free government publications and free electronic journals are a valuable resource for many libraries. How to collect statistics relating to these resources will be addressed in the future.

R2 NUMBER OF ELECTRONIC REFERENCE SOURCES

Definition: Number of electronic reference sources and aggregation services that the library provides to users either through an individual licensing contract with the content providers or through other arrangements (e.g., regional or state consortium) for which the library pays a reduced or no fee for access.

This includes citation indexes and abstracts; full-text reference sources (e.g. encyclopedias, almanacs, biographical and statistical sources, and other quick fact-finding sources); full-text journal and periodical article collection services (e.g., EBSCOhost, ProQuest, Academic Universe, and INFOTRAC OneFile); dissertation and conference proceedings databases; and general-purpose magazines and newspapers. Licensed electronic resources also include those databases that institutions mount locally

Rationale: Networking technology in libraries has improved and increased dramatically user access to a range of useful reference resources. This statistic documents the degree of expansion of electronic resource availability and can be used to justify continuation and enhancement of these services. In the 1990s, because of the increasing popularity of the Internet, the ways reference interviews were held and reference sources were used changed. Today, users have electronic formats as well as traditional reference sources to provide answers to their reference questions.

Research libraries traditionally act as gateways to a vast array of external information. This measure deals with the extensiveness of scholarly content the library provides to the user community and the availability of reference sources on an anytime/anywhere basis. In many cases, electronic access enables the library to offer more resources than it could in paper format. This statistic can also be used for library promotion and internal and external reporting. Specifically, this statistic aims at showing the changing nature of traditional scholarly resources with improved access.

Implementation

- ☐ Collected by: Local and vendors
- ☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- ☐ Procedures: As in the case of the number of electronic full-text journals, it is impossible to obtain the complete list of databases from a single source. Possible sources for the information include library catalog records (those records that point to web addresses), library web pages that list the database titles, the internal electronic resource management database, and vendor records (websites and contract documentation).

1. Create a master list of electronic databases from all the sources available. Use a spreadsheet or database program to organize and maintain the list.
2. Remove titles that do not meet the above-mentioned definition but keep duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
3. Record the counts and be sure they are updated regularly. The library should also update the count information on the library website and/or in marketing brochures on a regular basis.

Special considerations: The unit of measurement here is the database not the whole service provided by a vendor. For example, if the library subscribes to OVID and the company provides five databases (ABI/Inform, Books in Print, CINAHL, INSPEC, and PsycINFO), then the count is 5, not 1. By the same token, if the library subscribes to three database packages (Academic Universe, Congressional Universe, and Statistical Universe) from Lexis-Nexis, the count is 3.

This count should not include freely available databases to which the library provides links or library-created finding aids.

Freely available databases and library-created finding aids are a valuable resource for many libraries. How to collect statistics relating to these resources will be addressed in the future.

R3 NUMBER OF ELECTRONIC BOOKS

Definition: Number of electronic full-text monographs that the library offers to its users either through an individual licensing contract with the content providers or through other arrangements (e.g., regional or state consortium) where the library pays a reduced or no fee for access.

This includes electronic books purchased through vendors, such as netLibrary and Books24x7, and electronic books that come as part of aggregate services. It excludes internally digitized electronic books, electronic theses and dissertations, digitally created archival collections (e.g., Early English Books Online), and other special collections. This also excludes publicly available electronic books to which the library provides web links. It does not include machine-readable books distributed on CD-ROM, or accompanied by print books.

Rationale: Networking technology in libraries has improved and increased dramatically user access to the electronic counterparts of some traditional sources. This statistic documents the degree of expansion of e-books. In the mid 90s, networking and resource sharing technologies provided libraries with print books and e-books that were made available through a library's networks.

Because the evolving nature of this statistic will heavily depend on technological enhancements, all libraries are encouraged to use extra caution while pursuing their institutional goals, missions, and visions. Moreover, the definition of e-books is still evolving. This statistic is an early attempt to keep track of this type of resource as it becomes more widely available.

Implementation

☐ Collected by: Local and vendors

☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

☐ Procedures:

1. For each electronic book collection, get the electronic title counts from either the providers or catalog records. Unlike electronic full-text journals and reference databases, it is not necessary to list the titles for each electronic book collection.
2. Count any duplicate titles resulting from multiple subscriptions (e.g., main library and medical or law libraries).
3. Record the counts and be sure they are updated regularly. The library should also update the count information on the library website and/or in marketing brochures on a regular basis.

Special considerations: Do not include book collections that are a part of aggregate services and function more as a reference collection (e.g., MD Consult reference books, ProQuest's Early English Books Online, and books@OVID). They should be reported in the electronic reference databases.

Do not include freely available electronic books such as titles available from the National Academy Press.

Related issues: Electronic books, still evolving in terms of technology and adoption for use, present a number of issues in terms of definition and measurement, such as "location," accessibility (metadata and access points), and use versus circulation (e.g., is online use for 20 minutes a circulation, as it would be with reserve materials, or does a circulation of electronic books require a minimum period of use, such as 24 hours?).

☐ What about reference book collections provided by vendors? Should they be treated as electronic books, for example, or should they be treated as a database, on the grounds that they are used as databases?

Count only those books that a user can check out, as they would traditional books. Unlike traditional books that the library purchases and owns, electronic books can be subscribed to for an ongoing fee. In this case, the library accounting system may treat these as serials rather than books because of the type of payment. It is relatively easy to keep track of the number of electronic books right now since most libraries deal with only a handful of e-book vendors, such as netLibrary and Books24x7. But in the future, it will become increasingly difficult to do this as the sources of electronic books proliferate.

Finally, some provisions of contractual agreements between libraries and vendors may limit the level of use of e-books. These issues need be addressed in future research.

Use of Electronic Networked Resources and Services

High use of a library resource or service implies a collection development program that is working to create access to the resources customers need. Use and the need can also identify resources and services that are seen as particularly valuable in the education and research enterprise and should be expanded, or perhaps resources and services that should be discontinued due to lack of use and interest. Whether provided by vendors or collected institutionally, usage statistics can help a library administrator make decisions and plan for the future in order to meet not only users' expectations and needs but also institutional goals. The reported data can also provide other information as to where and when people use the library's materials and how well the library serves its target audience and anticipates their potential needs.

The cost of providing access to networked resources and services can be more expensive than that of traditional counterparts. Depending heavily on earlier ICOLC guidelines, the E-Metrics use measures put this in the perspective of the changing academic research library environment. The purpose of the use measures is to provide statistics relating to the use of networked services and resources. Therefore, it is expected that library administrators can reconsider some resource allocation issues as the number of resources and services tend to increase while people are provided greater access. Please note that, as with most of the statistics in this study, statistics related to the use of library resources and services should be revisited and perhaps modified as the technology advances.

- ☐ U1 Number of electronic reference transactions
- ☐ U2 Number of logins (sessions) to electronic databases
- ☐ U3 Number of queries (searches) in electronic databases
- ☐ U4 Items requested in electronic database
- ☐ U5 Virtual visits to library's website and catalog

Use of Networked Resources and Services

U1 NUMBER OF ELECTRONIC REFERENCE TRANSACTIONS

Definition: Number of electronic reference transactions conducted via email, a library's website, or other network communications mechanisms designed to support electronic reference. An electronic reference transaction *must* include a question *either* received electronically (e.g., via e-mail, WWW form, etc.) *or* responded to electronically. Those transactions that are both received and

BEST COPY AVAILABLE

responded to electronically are counted as *one* transaction. This count excludes phone and fax traffic unless either the question or answer transaction occurs via the described manner. It includes the counts accrued from participation in any local and national projects, such as DigiRef and the Library of Congress's CDRS (Collaborative Digital Reference Service).

A reference transaction is an information contact, which involves the knowledge, use, recommendations, interpretation, or instruction in the use of one or more information sources by a member of the library staff.

Rationale: Libraries are making more of their services available electronically and are interested in tracking the development of a new and emerging library service. There is a need to better document this transition to facilitate and improve resource allocation activities. This statistic represents reference activities conducted electronically in the library. It is an attempt to measure reference transactions through new electronic tools.

Implementation

- ☐ Collected by: Local
- ☐ Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly). This statistic can be collected in the same manner as the library gathers other reference transactions data.
- ☐ Procedures:
    1. Select a typical week (or month) to run a sample study. Be sure to vary the specific week (or month) chosen over the course of a year or from year to year to account for seasonal fluctuations.
    2. Key tasks include distributing a daily tally sheet, collecting the daily tally sheet, adding each day's totals to a weekly figure, and being available to respond to data collection problems should they occur.
    3. Transactions may be via e-mail, a form on a web page, etc. Electronic reference transactions may involve more than reference desk staff (e.g., web master, various reference personnel, library director, volunteers, etc.). Establish an administrative procedure to report electronic reference transaction counts to a designated staff person, no matter who receives the questions or answers the reference requests.
    4. Disseminate the new procedure and rationale. Several notices throughout the year may be necessary.
    5. Report an electronic reference transaction as you would a face-to-face reference transaction. Thus, one e-mail request may contain several reference questions taking varying times to complete. For example, one e-mail request could contain two relatively short reference questions and one reference question that took 10-15 minutes to answer. Count the number of requests, not the number of questions. Thus, in the example you would report one (1) as the number of electronic reference transactions even though there were three questions. Report counts using pre-established local library reporting periods (weekly, monthly, etc.).
    6. Indicate and describe any additional methods used outside of this definition and guidelines.

Special considerations: Unless the library uses electronic reference management software to collect and report transaction data, it is difficult to keep track of a complete reference transaction cycle (query and response) because of time-delays and the involvement of several parties.

As stated in the definition, the statistic includes the number of service transactions provided to patrons outside the university or the parent institution that the library serves, through regional or national cooperative efforts and through library policies.

Related issues: Reference services are undergoing rapid changes. Libraries are experimenting with different modes of electronic reference. One could say that simple email transactions that are prominently mentioned in the procedures are not much different from traditional reference services. How can a library measure quality in providing different types of electronic reference services such as live-chat with text/voice/video? Will this measure help the library determine user demand and thereby plan for resource allocation? To answer these questions, libraries need to collect more detailed information such as length of time taken to answer questions, types of questions by types of transactions, and so on. Also, this statistic is likely to produce some useful figures and trends regarding staff support and allocation in reference activities.

U2 NUMBER OF LOGINS (SESSIONS) TO ELECTRONIC DATABASES

Definition: Number of user initiated sessions in licensed electronic resources. A session or login is one cycle of user activities that typically starts when a user connects to a database and ends with explicit termination of activities (by leaving the database through logout or exit) or implicit termination (time out due to user inactivity). Licensed electronic resources also include those databases that institutions mount locally.

Rationale: One purpose of having a networked environment is to promote connectedness and accessibility to a variety of information resources, hence the need for this measure. Also, the gradual shift in the materials expenditures from traditional print-based resources to electronic databases can be understood with the measure. This measure will produce a count of how often specific databases are used and complement traditional physical attendance counts.

Implementation: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. At least on the database title level, usage statistics should be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

☐ Collected by: Vendor

☐ Frequency: Monthly, but can be reported quarterly or annually

☐ Procedures:

1. Process monthly usage statistics from vendors and copy or import the number of attempted sessions in each database (in each journal collection for full-text journals) to an in-house spreadsheet or database file.
2. Calculate the total sessions for a given month by adding the number of sessions from each database or journal collection.

Special considerations: Not all vendors report this statistic. Therefore, it will be necessary to qualify the statistic with a sentence such as this: "We have 150,000 logins recorded from 120 databases out of 200 subscribing. We cannot report this statistic for the remaining 80 databases because the vendor does not supply login (session) information to customers."

Related issues: When analyzing the login counts, it might be important to explain any increases or decreases in the figures. Specify, for example, whether the increase comes from (1) the addition of new databases, (2) databases which did not report the statistic in the past but have now begun reporting, (3) increased demand, and/or (4) an increase in the number of simultaneous users.

Problems with the comparability of login counts from different vendors is a serious threat to the utility of the combined count. Content providers use different time-out thresholds (ranging from 7 to 30 minutes on average). Also, because of the IP-based authentication, several sessions conducted at the same public workstation can be counted as a single login. Alternatively, libraries can collect attempted logins to various licensed databases by making users go through a central gateway (which counts all attempted logins). This will ensure that one login attempt to a database is the same as a login to other databases. However, what this data collection method misses is user logins that go directly to content provider sites. It is unclear how many user logins fall into this category, but the phenomenon certainly results in a substantial undercount of user logins.

While the gross login figure is useful, it is useful only for trend plotting and gross justification of electronic resources. Within the library, the usage measures of licensed electronic resources have many users and uses. Circulation of usage statistics on the database title level (or in an extreme case on the journal title level) and discussion of any noticeable changes (or lack thereof) need to occur at various levels among the concerned parties, including collection development personnel, web master(s), technical services staff, and so on.

U3 NUMBER OF QUERIES (SEARCHES) IN ELECTRONIC DATABASES

Definition: Number of user initiated queries (searches) in licensed electronic resources. A search is intended to represent a unique intellectual inquiry. Typically, a search is recorded each time a search request is sent/submitted to the server.

Rationale: This statistic provides libraries with an indication of the databases that are most heavily used, areas of user interest, database popularity, and a level of usage detail that goes beyond an initial session. It also can provide important information for billing purposes, as some vendors charge for database usage by number of searches. This statistic can complement U1, the number of electronic reference transactions, as more user requests bypass staff mediations. Some portion of this statistic is also analogous to in-library use of reference sources.

Implementation

☐ Collected by: Vendor

☐ Frequency: Monthly, but can be reported quarterly or annually

☐ Procedures: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. Usage statistics need to be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.

1. Process monthly usage statistics from vendors and copy or import the number of attempted searches in each database to an in-house spreadsheet or database file.
2. Calculate the total number of searches for a given month by adding the number of searches from each database or journal collection.

Special considerations: Because some vendors do not report this statistic, it will be necessary to qualify the statistic with a sentence such as this: "We have 150,000 searches recorded from 120 databases out of 200 subscribing. The other 80 do not provide this statistic."

Related issues: Different assumptions about and mechanisms for collecting search counts by different vendors are potential threats to the combined count.

U4 ITEMS REQUESTED IN ELECTRONIC DATABASES

Definition: Number of items requested in all of the library's licensed electronic resources. These resources may include journal articles, e-books, reference materials, and non-textual resources that are provided to the library's users through licensing and contractual agreements. The user requests may include viewing, downloading, emailing, and printing to the extent the activity can be recorded and controlled by the server rather than browser.

The items reported depend on the type of content. Examples include citations, abstracts, tables of contents, and full-text articles (ASCII, HTML, PDF, or PS).

Rationale: This statistic provides a circulation count for electronic contents in a way analogous to the traditional circulation of books. Given the fact that libraries do not have good measurements of in-house materials usage, particularly serials usage, this statistic helps libraries understand in-library use patterns that were heretofore difficult to measure.

BEST COPY AVAILABLE

Implementation

- ☐ Collected by: Vendor
- ☐ Frequency: Monthly, but can be reported quarterly or annually
- ☐ Procedures: Until there is a standardized report generation system that captures different statistics from different content providers, we recommend that each library develop an in-house spreadsheet or database to capture monthly usage statistics of licensed databases. Usage statistics should be collected from vendors, entered into the in-house databank, and maintained for reporting and analysis.
    1. Process monthly usage statistics from vendors and copy or import the number of items selected for viewing, downloading, and emailing in each database. Count the number and type of items users selected: abstracts, citations, and full-texts.
    2. Calculate the total number of items for a given month by adding the number of items requested from each database or journal collection.

Special considerations: Because some vendors do not report this statistic, it will be necessary to qualify the statistic with a sentence such as this: "More than 150,000 items were requested from 120 databases out of 200 subscribing. The other 80 do not provide this statistic. Among the requested items, 100,000 were some form of full-text records."

Related issues: Different vendors apply different assumptions and mechanisms in collecting items requested counts. This lack of standardization makes it difficult to calculate an aggregate count.

We do not have good measurement of in-house materials usage, particularly journal usage. However, electronic journals and databases allow libraries to find out how often materials are requested. Having in-house usage figures is important for understanding the dynamics of usage between print and electronic journals, so that we can ascertain any correlation between them.

U5 VIRTUAL VISITS TO LIBRARY'S WEBSITE AND CATALOG

Definition: This is defined as user visits to the library's website or catalog from outside the physical library premises regardless of the number of pages or elements viewed. If a user looks at 16 pages and 54 graphic images while at a website, that user registers one visit on the web server. All visits to the website should be counted regardless of repetition by one user. A visit is usually determined by a user's IP address, which can be misleading due to Internet Service Providers (ISPs) and Firewalls or Proxy Servers. Thus, this measure is actually an estimate of the visits.

Rationale: Use of the website or catalog from outside the library reflects interest in library services. The role of networked services is to expand the reach of libraries beyond their physical boundaries. This statistic helps describe the significance of networked services use by measuring the number of virtual accesses. This will also give an opportunity for the library to compare the demand placed on their networked resources with that for other popular information-oriented websites (such as Excite, Lycos, etc.).

Implementation:

☐ Collected by: Local

☐ Frequency: Reported annually, although internal reporting will be more frequent (e.g., weekly, monthly, and quarterly).

☐ Procedures:

1. Identify all sources of virtual visits to the library. This may involve activities that take place on more than one web server. Some of the web servers may be owned by the library and some may be owned or maintained by another department in the university, an Internet Service Provider (ISP), or other library vendors (e.g., library OPAC provider).
2. Exclude internal use within the premises of the library from the counts for this measure when possible. Two common approaches are using IP addresses or some form of authentication tagged to each transaction. In terms of external visits to the library, three common sources are: external access to the library's web page, remote logins (sessions) to non-web-based library databases, and remotely accessible library OPAC.
3. Develop strategies for collecting the data from each of these sources of virtual visits. Different software may be needed to measure each electronic source of virtual visits. In some cases, the library may calculate the virtual visits using one or more log analysis software packages. In other cases, the external owner of the web server or service (the ISP) must provide the data. Discussions may need to be held with these service providers to obtain the needed data. In still other cases, custom programs may have to be developed.
4. In the case of library web pages housed on the library server, identify, configure, and install appropriate log analysis software. Determine log analysis software definition that corresponds to the virtual visit definition.

   Note: Different log analysis software packages may count virtual visits in different ways, so the count obtained will by necessity be an estimate. Arrange with the server technical staff for regular (monthly) reporting of internal visits at the various user access Internet workstations, external library user virtual visits, and total virtual visits (internal visits plus external visits). Run the log analysis software.
5. In the case of library web pages housed on an ISP's server, identify the log analysis software the ISP uses. Determine the definition of "visit" used by the log analysis software that corresponds to the virtual visit definition with the assistance of the ISP. Arrange with the ISP for regular (monthly) reporting of internal library visits at the various user access Internet workstations, external library user virtual visits, and total virtual visits (internal visits plus external visits).
6. Where virtual visit counts include the aggregate of internal and external visits, indicate this in your report.

Special considerations: Count all visits to the website regardless of repetition by one user as long as each visit meets the criteria for this statistic.

After one user connects to the Internet, several users could conduct multiple different searches in the electronic service. In some cases, e.g., Internet-accessible OPAC use inside the library, several users, one after the other, might make use of the same established connection. In most systems, a connection is cut off after a specified period of non-use, thus solving part of the problem. The best existing method of collecting virtual visits is to use log analysis software. The log analysis software producers may define virtual visits differently. For example, does a visit end after a time-out period of 30 minutes, 15 minutes, or some other time? The recommended time-out period is 30 minutes, but a local library may have to accept the available log analysis software's definition even if it varies from the above.

Some libraries will find it difficult to report every virtual visit. For example, libraries may have difficulty counting the use of library OPACS because their vendors do not provide this information. Make a record of those sources of virtual visits not counted. Do not estimate virtual visits for which data are not available.

Related issues: This measurement requires a relatively high degree of technical skills either on staff or available from the library's website host.

Expenditures for Electronic Resources and Related Infrastructure

This portion of the statistics is based on the *ARL Supplementary Statistics* Survey (the most recent survey instruction available at http://www.arl.org/stats/arlstat/#sup). In collecting the statistics, the library should refer to the procedures followed and the amounts reported in response to the *ARL Supplementary Statistics* Survey.

These statistics were developed by ARL to determine expenditure patterns on electronic and networked resources and the effect of new types of library resources and services, those delivered both individually and collectively with other institutions, on library expenditures. These measures are expected to help ARL libraries justify their growing budgets due to the great expense of electronic and networked services. These measures can help answer such questions as: How much are research libraries spending for electronic resources collectively and how much on average? How do expenditures for electronic resources compare across several research libraries?

We have not included the cost of the technical staff and their training, the networking and equipment to provide access to the electronic resources as well as the time of all the staff involved. This will have to be addressed in the future.

General Introduction to C1-C3

The report should include expenditures for electronic indexes and reference tools, electronic full-text periodical collections and electronic journal back-files, and online searches of remote databases – whether accessed remotely or installed locally from CD-ROM, magnetic tapes, etc. The report should also include expenditures for materials purchased jointly with other institutions if such expenditures can be separated from other charges for joint services, fees paid to bibliographic utilities if the portion paid for computer files and search services can be separately counted, and equipment costs when they are inseparably bundled into the price of the information product.

Expenditures for bibliographic utilities, networks, and consortia that are unrelated to end-user database access should be reported in C4, not in C1 through C3.

BEST COPY AVAILABLE

Expenditures for Networked Resources and Related Infrastructure

- ☐ C1 Cost of electronic full-text journals
- ☐ C2 Cost of electronic reference sources
- ☐ C3 Cost of electronic books
- ☐ C4 Library expenditures for bibliographic utilities, networks, and consortia
- ☐ C5 External expenditures for bibliographic utilities, networks, and consortia

C1 COST OF ELECTRONIC FULL-TEXT JOURNALS

Definition: Expenditures for electronic full-text journal subscriptions that the library provides to its users. Include both initial purchase cost, membership fees (such as JSTOR) as well as annual access and service fees paid directly or through consortia arrangements.

Rationale: This statistic, cost of electronic full-text journals, was developed by ARL to find out how much libraries are spending on electronic full-text journals and how new forms of electronic journals are replacing traditional journals and scholarly publications. It also indicates the extent of budget allocations for electronic resources. Furthermore, this statistic allows libraries to calculate unit costs of e-journals after collecting C1 and R1 statistics, and thus aids libraries in deciding how effectively they are serving their potential and intended audiences, and in benchmarking with the other institutions.

Implementation

- ☐ Collected by: Local
- ☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- ☐ Procedures: For the definition of electronic full-text journals, please refer to the definition of R1. Current library accounting systems do not support coding of materials expenditures by the categories used in the manual. Therefore, it may become necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics. Significant coordination is required for setting up the structure of the file, but in the long run may streamline many aspects of the management of electronic licensed materials.

    1. Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office.
    2. If you have not done so, organize the data using the sample worksheet in Appendix B, Figure B.1.

3. Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
4. If a fee is paid to a consortium or other joint arrangement, include the amount. In the case where a fee is paid for an aggregate service and the service contains different categories of resources (full-text journals and reference sources) as a bundle, use an estimate based on expected or historical use, or list prices.
5. Note any major commitments (such as JSTOR one-time costs) that do not occur year to year and that significantly influence the reported amount.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources at *a given point in time* (most likely at the end of the reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but can be very time consuming. You can report the annual amount paid without prorating on the basis that over the years the figures will even out.

Some electronic full-text journals come either as a free service with a print subscription or as part of a print-plus-online-access subscription (the library pays extra for electronic access). In the first case, the problem is whether or not to post any amount for the cost of electronic access. In the latter case, the question is how much of the cost can be attributed to electronic access.

C2 COST OF ELECTRONIC REFERENCE SOURCES

Definition: Expenditures for electronic reference sources and aggregate services that the library provides to users either through individual licensing contracts with content providers or through consortia or other arrangements where the library pays some fees. These fees include both annual access fees and other service costs paid to the vendor directly or through consortial arrangements.

Rationale: This statistic, cost of electronic reference sources, was developed by ARL to determine how much libraries are spending on electronic reference sources and how new forms of electronic reference sources are replacing traditional reference materials. It also gives insight into shifts in budget allocations from print to electronic materials, or new allocations exclusively for electronic materials. Furthermore, this statistic allows libraries to calculate unit costs of electronic reference sources after collecting C2 and R2 figures. This figure assists libraries in making decisions about how effectively they are serving their potential and intended audience, and in benchmarking with other institutions.

Implementation

☐ Collected by: Local

☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

BEST COPY AVAILABLE

❒ Procedures: For the definition of electronic reference sources, please refer to the definition of R2. For libraries that do not have acquisitions systems which support coding of materials expenditures by the categories used in the manual, it may be necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics.

1. Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office.
2. If you have not done so, organize the data using the sample worksheet in Appendix B, Figure B.1.
3. Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
4. If a fee is paid to a consortium or through other joint arrangement, include the amount. If a fee is paid for an aggregate service and the service contains different categories of resources (full-text journals and reference sources) as a bundle, use an estimate based on expected or historical use, or list prices.
5. In the comments field of the sample worksheet (Appendix B, Figure B.1), report any major commitments that do not occur year to year and that significantly influence the reported amount.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources *at a given point in time* (most likely at the end of reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but can be very time consuming. You can report the annual amount paid without prorating on the basis that over the years the figures will even out.

C3 COST OF ELECTRONIC BOOKS

Definition: Expenditures for electronic full-text monographs that the library offers to its users. Include both initial purchase costs and membership fees as well as annual access and service fees paid directly or through consortia arrangements.

Rationale: This statistic, cost of electronic books, was developed by ARL to determine how much libraries were spending on electronic books. It also gives an idea about the extent of budget allocations for electronic resources. Furthermore, this statistic allows libraries to calculate unit costs of e-books after collecting C3 and R3 statistics, aids them in determining how effectively they are serving their potential and intended audiences, and assists them in benchmarking with other institutions.

Implementation

☐ Collected by: Local

☐ Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)

☐ Procedures: For the definition of electronic books, please refer to the definition of R3. Current library accounting systems generally do not support coding of materials expenditure by the categories used in the manual. Therefore, it may become necessary to create an in-house spreadsheet or database file to keep track of cost information according to the types of resources (e-journals, reference databases, and e-books). Preferably a single file will contain contract information (duration, cost), updated title counts, and reported usage statistics.

1. Gather reports and invoices related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office. You may also need to review circulation records to verify the accuracy of invoices if additional per-use fees are paid (royalty on use, as with E-reserves).
2. If you have not done so, organize the data using the sample worksheet in Appendix B, Figure B.1.
3. Even if a licensing contract or consortium arrangement period is different from the reporting period, use the annual licensing fee to calculate the statistics.
4. If a fee is paid to a consortium or other joint arrangement, include the amount.
5. Note any major commitments (such as netLibrary purchase costs) that do not occur year to year and that significantly influence the reported amount.

Special considerations: Whereas the patron accessible resource counts reflect the extensiveness of electronic resources at *a given point in time* (most likely at the end of the reporting period, be it a month or a year), the cost figures cover *a period of time*. Ideally the amount of money spent reflects the number and extensiveness of resources. Prorating licensing fees addresses part of the problem of matching the resources with the money spent, but it can be very time consuming. You can report the annual amount paid without prorating with the rationale that over the years the figures will even out.

Traditionally books are purchased on a one-time payment in exchange for permanent ownership by the library. However, with regard to electronic books, it appears that some arrangements allow libraries to subscribe to an e-book collection at a predetermined fee and for a predetermined interval of time. We are concerned with the format of the material, not the subscription or payment arrangement. These materials should be counted as books, not serial publications.

Related issues: In many instances, the physical form of the material (print, electronic) may change the nature of the object. An electronic book is a good example. With enhancements such as full-text searching (although print books too have some search capability through tables of contents and indexes), electronic books support new forms of searching not present in print.

C4 LIBRARY EXPENDITURES FOR BIBLIOGRAPHIC UTILITIES, NETWORKS AND CONSORTIA

Definition: Expenditures paid by the library for services provided by national, regional, and local bibliographic utilities, networks, and consortia such as OCLC, RLG, *excluding fees paid for user database access and subscriptions*, which should be reported in C1 through C3.

Rationale: This statistic is based on the *ARL Supplementary Statistics* Survey. It was developed by ARL to determine how much money libraries spend for bibliographic utilities, networks, and consortia. Because individual libraries often have to deal with special provisions and funding issues related to contracts, this statistic may not lend itself to comparability among ARL member libraries. Nevertheless, it represents an attempt to keep track of the financial relationships between bibliographic utilities and libraries. Although this may provide very limited comparability, it is an estimate of the cost of bibliographic utilities, networks, and consortia.

Implementation

☐ Collected by: Local

☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

☐ Procedures:

1. Gather reports and invoices with bibliographic utilities, networks, and consortia of which the library is a member for the whole or part of the reporting period. These documents are typically handled by the library's accounting office.
2. Identify only those expenditures paid to the bibliographic utilities, networks, and consortia for membership, maintenance, and other infrastructure. Do not include expenditures that are directly attributable to access of electronic resources. Those expenditures should be included in C1 through C3.

   For instance, if your library paid a total of $100,000 to OCLC for its various services and your best guess of electronic database access portion of the services is 80%, then you should report $80,000 for C2 and the remaining $20,000 for C4.
3. Even if a membership or consortium period is different from the reporting period, use the amount of the membership or consortium agreement.
4. Use the sample form in Appendix B, Figure B.2 to compile the expenditures.

Special considerations: Prorating can be time consuming. Consortia or other memberships may bring additional benefits, such as subscriptions, training or preferential pricing for acquisition of materials. It may be difficult to separate pure membership fees from value-added services of membership (e.g.,

403

original catalog credits from OCLC that may be used to offset costs of databases, purchase of catalog records, etc.). Report the annual amount paid without prorating with the rationale that over the years the figures will even out.

C5 EXTERNAL EXPENDITURES FOR BIBLIOGRAPHIC UTILITIES, NETWORKS, AND CONSORTIA

Definition: Expenditures paid by external agencies, such as state government agencies, on the library's behalf for access to computer files, electronic serials, or search services through a centrally funded system or consortial arrangements. Examples include state- (or province-) supported networks such as VIVA (Virginia), CNSLP (Canadian National Site Licensing Project), and the University of California's California Digital Library Expenditure.

Rationale: Like statistic C4, this statistic is based on the *ARL Supplementary Statistics* Survey. It was developed by ARL to determine how much money is spent for bibliographic utilities, networks, and consortia on libraries' behalf for access to computer files, serials, and/or services through consortial arrangements. Because of contractual issues, this statistic may provide little comparability among ARL member libraries. Nevertheless, it can give ARL members an estimate of the external costs of bibliographic utilities, networks, and consortia.

Implementation

☐ Collected by: Local and external bodies such as regional and academic consortia

☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly).

☐ Procedures:

1. Gather reports and invoices with bibliographic utilities, networks, and consortia that are related to electronic databases and resources for the reporting period. These documents are typically handled by the library's accounting office. However, they can be maintained outside the organization and, in some instances, may only be provided to libraries upon demand.
2. Find out how much of the central funding is attributable to your library. For example, if your library contributes a total of $60,000 over a period of three years to a state consortium that has a matching contribution of $120,000 for the same period, the amount to report as C5 for a given year during the three-year period will be $40,000 ($120,000 x 1/3). The library's contribution ($60,000) has to be divided annually and posted in C1 through C3.

   If the specific dollar amount is not known, but the total student FTE (full-time equivalent) for the consortium and the amount spent for the academic members are known, divide the overall amount spent by your institution's share of the total student FTE. Alternatively, if the consortium is comprised of different types of institutions (academic, public, or corporate),

BEST COPY AVAILABLE

but the library has information about the portion of its own use among the consortium participants, multiply the total amount by the percentage of known (or estimated) usage rate.

3. As a last resort, consult with a staff member overseeing the consortium or the central funding system to get an estimate of the portion of the central funding that is attributable to the library. Please make a note of this in the comments field in the sample worksheet (Appendix B, Figure B.3).
4. Use the sample form in Appendix B Figure B.3 to compile the expenditures.

Statistics Related to Library Digitization Activities

Comprised of resource and use measures, the digital collection measures attempt to describe where libraries are in creating and making available local (perhaps unique) content that may not have been previously accessible. Such collections can attract students and faculty to your university and thereby enhance the institution's reputation. As more libraries digitize resources, more users will be able to retrieve those unique resources at anytime and from anywhere. Digital library projects, as well as other network resources and services, also will serve increasing numbers of students taking courses online.

Collecting library digitization measures may provide an opportunity for benchmarking and may encourage libraries to devote more time and allocate more resources to this worthwhile endeavor. It should be noted that these statistics represent a very early attempt to measure digitization of resources; as time passes and the technology advances, some of the definitions and procedures may need to be revisited and modified. During the field-testing it was reported that storing and maintaining digitized resources had been an issue. The unavailability of an appropriate infrastructure in some institutions meant that the project did not include statistics related to library digitization projects.

Libraries archive the scholarly output of their institutions – theses and dissertations – in both paper and digital form. Digital collections also provide new opportunities with faculty to archive research results. These statistics, although preliminary, form a basis for tracking these issues.

☐ D1 Size of library digital collection
☐ D2 Use of library digital collection
☐ D3 Cost of digital collection construction and management

Library
Digitization
Activities

D1 SIZE OF LIBRARY DIGITAL COLLECTION

Definition: Library digital collection refers to digital materials (texts, images, and audio-visuals) created in or converted from different formats (e.g., paper, microfilm, tapes, etc.) by the library and made available to users electronically. This includes electronic theses and dissertations (ETDs), special collections materials, maps, sound recordings, films, and other digital materials that are not purchased or acquired from outside through individual or consortial licensing agreements. It includes the number of titles and size (in gigabytes) by sub-categories (ETD, visual materials, texts, multimedia), and as an aggregate at the end of the reporting period. It also includes the number of items (titles) added during the reporting period.

The types of formats in Appendix B, Figure B.4, refer to original formats rather than the digitized outputs. Examples of visual materials include photos, maps, and postcards. Examples of text include books, journal articles and pamphlets. Examples of multimedia include audio, video, and other interactive materials. However, this statistic does not include any back up copies or mirror sites because items should be counted only once.

Rationale: Collecting library digitization measures may provide an opportunity for benchmarking in terms of file sizes for the resources that have been digitized. Moreover, the statistic can demonstrate that libraries are not merely brokers of external information resources, but also producers of information content and useful finding aids.

This statistic provides information on the extent of digital library projects, the life cycle of such projects, and the "virtual space" requirements of such collections.

Implementation

- ☐ Collected by: Local
- ☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)
- ☐ Procedures: For cases in which multiple digital formats (derivatives) were produced from an item, count it only once based on the type of item that was digitized. For example, if a 100-page book was digitized in 100 TIFF files, each containing a page, a 100-page PDF file, and 10 PDF files (one PDF file for each of 10 chapters), count it as a single text with 100 pages. If a derivative item was used as the source, do not count the outputs. But in the total size (in gigabytes) include all versions of derivatives.
  1. Designate a staff member to coordinate the collection of this statistic. The person should be well aware of library digital collection activities.
  2. Identify library staff in charge of various digital library projects and initiatives.
  3. It is necessary to conduct an inventory of digital material stock using the sample tally worksheet in Appendix B, Figure B.6 if it has not been done already. If this inventory information is already available, enter it into the worksheet. When the inventory is completed, summarize the information using the sample worksheet in Appendix B, Figure B.4. Add additional categories if necessary.
  4. After obtaining the inventory information, ask staff members to keep track of additional output regularly using the sample tally worksheet in Appendix B, Figure B.6.
  5. At the end of the reporting period, collect the worksheets and calculate the total production during the reporting period using the worksheet in Appendix B, Figure B.5. Add additional categories if necessary.

Related issues: Realistically, each digital collection is unique in terms of the production process, the way it is intended to be used, its focus, and maintenance. It is important to use appropriate units of measurement to describe the overall size and extensiveness of the whole collection.

Because of the wide variations of the types and features of digital collections constructed at ARL institutions, this statistic may be more useful locally than for comparison across ARL member libraries. Benchmarking may, however, be possible from the data collected to produce some qualitative and quantitative indicators as to the extent of digital library collection activities and different emphases across the ARL membership.

D2 USE OF LIBRARY DIGITAL COLLECTION

Definition: Number of times library digital collection titles and physical files were accessed and the number of searches (queries) conducted (if there is such a capability) during the reporting period.

Rationale: Each digital collection is unique in terms of its focus, production process, and the ways it is intended to be used and maintained. Therefore, because of the wide variations of the types and features of these library collections constructed at different ARL institutions, this statistic needs to be collected and used locally instead of across ARL member libraries. Nevertheless, this statistic has the potential to produce some qualitative and quantitative indicators as to how these collections are being used and serving the intended user community's needs.

Implementation

☐ Collected by: Local

☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

☐ Procedures:

1. Designate a staff member to coordinate the collection of this statistic. The person should be well versed in the use of web log software and/or statistics provided by the software. This person will act as a liaison for staff members who are responsible for managing library digital collections. Obtaining the statistic may require some level of programming (e.g., Unix scripting and SQL).
2. Items accessed can be collected in various ways, and depending on your library's environment, your library may need to collect different access statistics.

   Although you are asked to collect both title access and physical file access, if it takes too much time and effort to collect the title access, report the physical file access count only. For example, a book can be digitized and made into 10 PDF files, each containing a chapter, for access. Suppose a user viewed five PDF files out of 10. In this case, you will have five physical item accesses and one title access. Usually it is easier to have a physical item access count, while it takes custom programming to compute the title access count as most off-the-shelf web traffic software packages do not provide this.

Do not report web page hits. Instead, count how many times the digitized items were accessed (the exact name for item access may vary depending on the type of web traffic analysis software being used in the library).

If a search capability is a feature of a library digital collection, the total number of searches submitted needs to be collected. A search represents an explicit user request for specific information in a database and is expressed usually in the form of word strings. Clicks on web page buttons, such as "Next" and "Previous," do not count as user searches.

You might want to install web traffic analysis software (e.g., WebTrends, Web Tracks) on the library web servers housing library digital collection materials, if the web servers do not have such software already. You might want to consider installing a trial version that gives between 30-180 days of free trial.

Read the description of reported statistics carefully and make sure that the software provides what you want.

3. If continuous collection of use statistics is not possible or desirable, select a typical week (or month) to run a sample study. Be sure to vary the specific week (or month) chosen over the course of a year or from year to year to account for seasonal fluctuations. Extrapolate based on the sample data.
4. At the end of the report period, use the log analysis report to calculate the number of accesses to library digital collection items. Use the sample report in Appendix B, Figure B.7, to organize the information.

Special considerations: To the extent possible, exclude accesses by web search spiders. Also, do not include accesses to auxiliary (or incidental) items that are not part of the library digital collection content (.gif buttons and image maps for navigation). Note the method used and include a description of any filtering done.

Related issues: This statistic needs to be collected and used locally instead of across ARL member libraries because of the wide variations of the types and features of digital collections constructed at ARL institutions.

D3 COST OF DIGITAL COLLECTION CONSTRUCTION AND MANAGEMENT

Definition: Annual direct costs (personnel, equipment, software, contracted services and similar items) spent to create digital materials (texts, images, and multimedia) or to convert existing materials into digital form for the purpose of making them electronically available to users. Include expenditures related to digitization, OCR, editorial, creation of markup texts, preparation of metadata for access to digitized materials, data storage, and copyright clearance.

Exclude expenditures for information resources purchased or acquired from outside the institution through individual or consortial licensing agreements.

Rationale: The cost of each digital collection construction may vary significantly, depending on the size of the collection, conditions of the sources before digitizing, available infrastructure, staff allocation, timeline, and administrative support. This statistic should be collected and used locally instead of across ARL member libraries because of the wide variability among these library collections constructed at different ARL institutions. Nevertheless, this statistic has the potential to provide quantitative indicators as to how costly these efforts are, how much resource allocation (i.e., budget allocation, staffing, infrastructure, etc.) is needed, and how well they serve the intended user community's needs (e.g., to account for internal and external costs to construct and manage digital collections at ARL libraries).

Implementation

☐ Collected by: Local

☐ Frequency: Reported annually, although internal reporting may be more frequent (e.g., monthly, quarterly)

☐ Procedures:

1. Designate a staff member to coordinate the collection of this statistic.
2. Direct the designated staff member to contact library staff members who are in charge of digital collection projects. Ask all library staff members involved in any digital collection projects as part of their official responsibilities to fill out the worksheet in Appendix B, Figure B.8, for the reporting period. Ask them to estimate how much of their time was spent on planning, implementing, and managing digital collection projects. This information will be entered in the worksheet as FTE. A further breakdown of activities may be necessary if the library wants to have more detailed information on the distribution of efforts.

   Note that annual salary should not be asked of the staff members filling out the worksheet and should not include fringe benefits. When all the worksheets are collected, the salary information will be obtained from the library accounting or personnel department. Direct staff cost will then be calculated.

   The personnel cost should also include wages paid to non-salaried staff, including student and other hourly workers.
3. Cost of equipment should be amortized. For example, if a $3,000 scanner was purchased at the beginning of the reporting year and has a depreciation period of three years, register $1,000 as the equipment cost. Costs of software should be reflected in full amounts based on the time of the purchase.
4. If a subcontracting period is different from the reporting period, prorate the amount for the reporting period. If the payment is based on percent to completion, include only the amount that belongs to the reporting period.
5. Use the sample worksheet in Appendix B, Figure B.9, to calculate the total cost.

BEST COPY AVAILABLE

Related issues: This statistic needs to be collected and used locally instead of across ARL member libraries because of the wide variations of the types and features of digital collections constructed at ARL institutions.

Analysis of Suggested Performance Measures

The overall rationale for the performance measures in this study is to provide a means for measuring the proportion of services delivered through traditional channels relative to analogous services delivered through electronic channels. These measures will help document trends in service delivery for the purpose of allocating staff and development resources as well as identify trends for strategic planning of service delivery.

Performance Measures

- ☐ P1 Percentage of electronic reference transactions of total reference
- ☐ P2 Percentage of virtual library visits of all library visits
- ☐ P3 Percentage of electronic books to all monographs

P1 PERCENTAGE OF ELECTRONIC REFERENCE TRANSACTIONS OF TOTAL REFERENCE

Definition: Percentage of annual electronic reference transactions to total reference transactions. An electronic reference transaction *must* include a question *either* received electronically (e.g., via e-mail, WWW form, etc.) *or* responded to electronically. Count excludes phone and fax traffic unless either the question or answer transaction occurs via the described manner. It includes the counts accrued from participation in any local and national projects, such as DigiRef and the Library of Congress's CDRS (Collaborative Digital Reference Service).

Total reference = Traditional reference counts (include face-to-face reference transactions, telephone and fax reference counts) + electronic reference transaction counts.

$$\text{P1} = \frac{\text{U1(p. 11)}}{\text{TOTAL REFERENCE TRANSACTIONS}} * 100$$

Rationale: The purpose of having a networked environment is to promote connectedness. This measure provides an indication of a changing library environment. While in the traditional library environment reference transactions were handled mainly through non-electronic means, in the current environment

BEST COPY AVAILABLE

reference transactions can be handled via various electronic means over the Internet. By having this as a measure, libraries are able to track the development of a new and emerging library service and have a number that fully represents reference activities. This measure may indicate how often various electronic applications are used in any given period and also assist decision-makers in reallocating resources. Moreover, this performance measure will give administrators trend data on how network services are being used and this data can then be used for future planning.

Implementation

☐ Collected by: Local

☐ Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)

☐ Procedures:

1. If continuous collection of this statistic is not possible or desirable, select a typical week (or month) to run a sample study. It is recommended that you sample a week in a different month or several months to account for seasonal fluctuations. Extrapolate based on the sample data.
2. Designate a staff member to coordinate the collection of this measure. Key tasks include distributing a daily tally sheet, collecting the daily tally sheet, adding each day's total to a weekly figure, and being available to respond to data collection problems should they arise.
3. For electronic transactions, use the count obtained by following the procedures for U1 (p. 11).
4. Total the overall number of transactions.
5. Divide the number of electronic reference transactions by the total number of transactions.
6. Multiply by 100.
7. Indicate and describe any additional methods used outside of this definition and these guidelines.

Special considerations: Count the number of transactions, not the number of questions. That is, if one request is emailed with three questions, it should be counted as one transaction, not three.

P2 Percentage of Virtual Library Visits of All Library Visits

Definition: Number of virtual library visits out of all library visits.

A *virtual library visit* is when a user visits the library's website or catalog for any length of time or for any purpose from outside the physical plant of the library, regardless of the number of pages or items viewed or requested. The term "virtual visit" excludes in-library visits where a patron or a staff member uses electronic resources. If a user looked at 16 pages and 54 graphic images while at a website, that user registers one visit on the web server. A visit is usually determined by a user's IP address. Due to various server management issues and differing software, this measure is an estimate of the visits to the library site.

All library visits is the total of the number of virtual library visits plus the number of physical visits to the library including branches.

$$\text{P2} = \frac{\text{U5 (p. 16)}}{\text{Total Library Visits}} * 100$$

Rationale: People accessing the website or catalog from outside the library will reflect interest in library services. The idea of having network services is to expand the reach of libraries beyond their physical boundaries, and this performance measure can provide information about how far network services are reaching. This figure will also show the use of the library outside the regular place of business, which will be a more accurate depiction of library use. Having this measure is important to show the continued relevance of library service if physical attendance figures decrease.

Implementation

- ☐ Collected by: Local and/or vendors
- ☐ Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)
- ☐ Procedures:
  1. Obtain the virtual library visits count using the procedures for U5 (virtual library visits).
  2. Obtain physical attendance count from turnstile counts or swipe card records. To the extent possible, collect comprehensive data from all library branches.
  3. Combine the virtual visit count and the physical attendance count.
  4. Divide the number of virtual library visits by the total library visits.
  5. Multiply by 100. For example, a library had 1,000 external virtual visits and 9,000 physical visits for a total visit composite measure of 10,000. 1,000 virtual visits divided by 10,000 total visits equals .10 (or 10%).

P3 PERCENTAGE OF ELECTRONIC BOOKS TO ALL MONOGRAPHS

Definition: Percentage of the number of electronic books available to users (through either an individual licensing contract or other consortial arrangements) to all the library's monographs.

Rationale: Networking technology in libraries continues to improve, thereby increasing user access to electronic counterparts of some traditional sources. In the mid 90s, networking and resource sharing technologies facilitated print and e-book access through library networks. This performance measure attempts to document the degree of expansion of e-books to all monographs. Libraries should use caution while collecting this measure because the definition of e-books is itself still evolving. This statistic is an early attempt to keep track of this type of source that is becoming increasingly available.

Implementation

☐ Collected by: Local and vendors

☐ Frequency: Reported annually, although internal reporting may be more frequent (monthly, quarterly)

☐ Procedures:

1. Identify all types of monographic materials. Use in-house record-keeping sources and other library sources to determine the number of all monographs, including electronic books, non-electronic books, and other monographic materials.
2. Identify electronic book types, including electronic books and electronic full-text aggregate services, using the sources in step 1 of the procedures for R3.
3. Count individual electronic book titles. Record the number of individual electronic books from the spreadsheet or record the number from another source.
4. Exclude electronic reference books, i.e., publicly available electronic books that are accessed for free.
5. Calculate the total number of all monographs, including electronic books, non-electronic books, and other monographic materials.
6. Divide the number of electronic books by the number of all library monographs (electronic and non-electronic monographs).
7. Multiply by 100.
8. Indicate and describe any additional methods used outside of this definition and guidelines.

Improving Networked Statistics

With the ever-increasing portion of library collections' dollars committed to networked services, there is a pressing need to better understand the impact from the increase of such services and supporting technology. To begin overcoming the relatively little that is known about how these services are used, who uses them, and what impact these services have, the statistics and performance measures offered in this manual provide a start.

As reflected by the interest and efforts of the many ARL libraries that participated in the E-Metrics project, the development of library networked statistics and performance measures continues to receive increased attention and support. There is broad recognition of the need for network statistics and performance measures that:

- Assist libraries in making a strong case for support of technology and information infrastructure by documenting their Internet-based services and resources;
- Assist libraries in demonstrating the use of digital collections in order to make a case for continued collection development and support;
- Allow libraries to effectively compare themselves to others in terms of Internet-based collection and service development, costs, provision of services, connectivity, and use;
- Allow libraries to measure and track internal changes to library operations as well as uses and users of library resources and services;
- Enable library directors and administrative library agencies to compete for resources with other organizations and/or departments by documenting the range, extent, and impact of library-provided networked services;
- Facilitate the expansion from traditional library use measures such as circulation, reference transactions, interlibrary loans, etc., to include network measures that describe the nature and use of library-based network activities and resources;
- Provide a decision-making framework for library staff, managers, and administrators to determine resource allocation strategies and meet other management needs;
- Provide a means through which to measure the quality of library services and resources in the networked environment.

These and other factors point to the overall importance of the development, collection, and reporting of library network statistics and performance measures to facilitate collections decisions, cost analysis, justification of services, services planning and evaluation, and a host of other activities. It is hoped that the statistics and measures developed herein help fill many of the needs faced by academic and research libraries.

However, there are a number of issues and challenges that affect the library's ability to collect statistics and measures to describe its electronic resources and services. Some academic and research libraries possess inadequate resources, staffing, and expertise to collect, manage, and report the data related to describing networked services. For these libraries, some organizational development and commitment to collecting and using these data may be necessary to take advantage of the measurement tools and techniques outlined in this manual. The discussion of measurement issues in Parts 1 through 3 of the E-Metrics Phase II Report <http://www.arl.org/stats/newmeas/emetrics/> can assist libraries in better understanding why such measurement is essential.

Appendices

APPENDIX A - LIST OF STATISTICS CONSIDERED

APPENDIX B - FORMS

Appendix A: List of Statistics Considered

Categories	E-Metrics v1.0 (Initial List)	E-Metrics v.1.1 (Revised List)	E-Metrics v.2.0 (Field Test List)
Resources	☐Number of electronic full-text journals (hosted by library) ☐Number of electronic full-text journals (through subscription) ☐Number of librarians providing electronic reference ☐Number of public access workstations	☐Number of electronic full-text periodicals (hosted by library) ☐Number of electronic full-text periodicals (through institutional subscription) ☐Number of electronic full-text periodicals (through consortia and other arrangements) ☐Number of electronic reference databases (through institutional subscription) ☐Number of electronic reference databases (through consortia and other arrangements) ☐Number of electronic books ☐Number of staff providing electronic reference ☐Number of public access workstations	☐Number of electronic full-text journals (institutional) ☐Number of electronic full-text journals (consortia) ☐Number of electronic reference sources (institutional) ☐Number of electronic reference sources (consortia) ☐Number of electronic books (institutional) ☐Number of electronic books (consortia)
Use	☐Logins (sessions) ☐Queries (searches) ☐Turn-aways (requests exceed simultaneous user limit) ☐Items examined (viewed, downloaded, emailed, printed) ☐Total user connection time to vendor databases ☐Virtual visits to networked library resources ☐Electronic reference transactions ☐Number of people participated in user instruction on electronic resources	☐Number of logins (sessions) to networked library resources ☐Electronic reference transactions ☐Number of Logins (sessions) to electronic databases ☐Queries (searches) ☐Total connection time to electronic databases ☐Items examined (viewed, downloaded, emailed, printed) to electronic databases ☐Turn-aways (requests exceed simultaneous user limit) ☐Number of people participated in user instruction on electronic resources and services	☐Number of electronic reference transactions ☐Number of logins (sessions) to electronic databases ☐Number of queries (searches) in electronic databases ☐Items examined in electronic databases
Cost	☐Cost of electronic database subscriptions ☐Cost per items examined (subscribed databases)	☐Cost of electronic files (one-time/monographic purchase) ☐Cost of electronic full-text periodicals subscriptions ☐Cost of electronic reference databases subscription ☐Library contribution to consortia for electronic databases	☐Cost of electronic full-text journals ☐Cost of electronic reference sources ☐Cost of electronic books ☐Library expenditures for bib. utilities, networks, and consortia ☐External expenditures for bib. utilities, networks, and consortia
Local Digital Collection	☐Cost of internal digital collection construction	☐Cost of internal digital collection construction	☐Size of library digital collection ☐Use of library digital collection ☐Cost of digital collection construction and management
Performance Measures	☐Percentage of electronic reference transactions of total reference ☐Percentage of electronic materials use of total library materials use ☐Percentage of remote library visits of all library visits ☐Ratio of public access workstations to university population (number of faculty, staff, and students)	☐Percentage of electronic reference transactions of total reference ☐Percentage of electronic materials use of total library materials use ☐Percentage of remote library visits of all library visits ☐Percentage of electronic titles to all periodicals ☐Percentage of electronic books to all monographs ☐Ratio of public access workstations to university population ☐Cost per items examined in individually subscribed databases	☐Percentage of electronic reference transactions of total reference ☐Percentage of electronic materials use of total library materials use ☐Percentage of remote library visits of all library visits ☐Percentage of electronic books to all monographs

BEST COPY AVAILABLE

Appendix B: Forms

FORMS LIST

FIGURE B.1 SAMPLE ELECTRONIC RESOURCE COST REPORT FORM

FIGURE B.2 SAMPLE CONSORTIA EXPENDITURE REPORT FORM

FIGURE B.3 SAMPLE CONSORTIA FUNDING REPORT FORM

FIGURE B.4 SAMPLE LIBRARY DIGITAL COLLECTION INVENTORY REPORT FORM

FIGURE B.5 SAMPLE DIGITAL COLLECTION IITEMS ADDED REPORT FORM

FIGURE B.6 SAMPLE LIBRARY DIGITAL COLLECTION REPORT FORM

FIGURE B.7 SAMPLE DIGITAL COLLECTION ACCESS REPORT FORM

FIGURE B.8 SAMPLE DIGITAL COLLECTION COST REPORT FORM - PERSONNEL

FIGURE B.9 SAMPLE DIGITAL COLLECTION COST REPORT FORM

Figure B.1 (for C1-C3)

SAMPLE ELECTRONIC RESOURCE COST REPORT FORM

Reporting Period: ______________________

Name of library: ______________________

Resource/ Consortium Name and Type Full-text journals (1) Reference sources (2) Electronic books (3)	Cost	Comments
Sub Total (1)		
Sub Total (2)		
Sub Total (3)		
Grand Total (1+2+3)		

Figure B.2 (for C4)

SAMPLE CONSORTIA EXPENDITURE REPORT FORM

Reporting Period: ______________________________

Name of library: ______________________________

Consortium Name	Amount	Comments

Figure B.3 (for C5)

SAMPLE CONSORTIA FUNDING REPORT FORM

Reporting Period: ______________________________

Name of library: ______________________________

Consortium Name	Total Funding Amount	Amount Attributable to the Library	Comments

Figure B.4 (for D1)

SAMPLE LIBRARY DIGITAL COLLECTION INVENTORY REPORT FORM

Reporting period: ____________________________

Name of library: ____________________________

ETDs		Visual Materials		Texts		Audio/Video/Multimedia		Total	
Titles (1)		Items (2)		Titles (3)		Titles (4)		Titles (1+2+3+4)	
								Size (GB)	

Figure B.5 (for D1)

SAMPLE DIGITAL COLLECTION ITEMS ADDED REPORT FORM

Reporting period: ________________________________

Name of library: ________________________________

ETDs		Visual Materials		Texts		Audio/Video/Multimedia		Total	
Titles (1)		Items (2)		Titles (3)		Titles (4)		Titles (1+2+3+4)	
								Size (GB)	

Figure B.6 (for D1)

SAMPLE LIBRARY DIGITAL COLLECTION REPORT FORM

Reporting Period: ______________________________

Name of library: ______________________________

Project Name	Information Type 1. ETD 2. Visual Materials 3. Texts 4. Audio/Video/Multimedia	Server Name	Directory Location	No. of Titles	Size (GB)

Figure B.7 (for D2)

SAMPLE DIGITAL COLLECTION ACCESS REPORT FORM

Reporting Period: ________________________________

Name of library: ________________________________

Project Name	Server Name	Directory Location	Title Access Count	Item Access Count	Total Searches	Comments

Figure B.8 (for D3)

SAMPLE DIGITAL COLLECTION COST REPORT FORM – PERSONNEL

Reporting Period ______________________________

Name of library: ______________________________

Name	Position	(Annual Salary)	FTE	(Staff Cost)

Figure B.9 (for D3)

SAMPLE DIGITAL COLLECTION COST REPORT FORM

Reporting Period: ____________________

Name of library: ____________________

Project Name	Expense Type	Amount
Project (name) Total		
Project (name) Total		
Library Total		

429

ASSOCIATION OF RESEARCH LIBRARIES
WASHINGTON, D.C.
2002

MEASURES FOR ELECTRONIC RESOURCES (E-METRICS)

PART 5

Information Use Management and Policy Institute

Association of Research Libraries E-Metrics Project

http://www.arl.org/stats/newmeas/emetrics/index.html

Toward a Framework of Library and Institutional Outcomes

Bruce T. Fraser <bfraser@lis.fsu.edu>
Senior Research Associate, and Assistant Director

Charles R. McClure <cmcclure@lis.fsu.edu>
Francis Eppes Professor, and Director

Assisted by:

Emily H. Leahy
Arif Dagli
Ivey S. Darling

Research Assistants

January 2002

Information Use Management and Policy Institute
School of Information Studies
Florida State University
Tallahassee, Florida 32306-2100
850-645-3328
http://www.ii.fsu.edu

Table of Contents

Introduction 2

Background and Methodology 2

Selected Literature 5

Findings 7

  Discussion Forum 7

  Site Visits 10

  Accreditation Review 12

  Survey of ARL Members 14

Discussion 16

Challenges Related to the Use of Institutional and Library Outcomes 22

The Need for New Perspectives and Additional Research 25

References 26

Appendices

  Appendix A: Additional Resources 28

  Appendix B: Accreditation Review: Methodology and Documents 29

  Appendix C: Survey Instrument 32

  Appendix D: Content Analysis of the Survey by Question 39

Introduction

It is not enough simply to develop measures and collect statistics related to library networked resources and services. Indeed, as state legislatures increasingly tie budgets to performance and regional accreditation boards begin emphasizing the need to articulate outcomes, it is important for research libraries to decide what their outcomes should be and to determine how to connect measures and statistics to these outcomes at both the library and the university levels.

As part of the overall E-Metrics project, the study team has undertaken a number of outcomes-related activities. During Phase II of the E-Metrics project (November 2000 – June 2001), the study team was engaged in an extensive, ongoing effort to develop evolving frameworks for understanding and graphical models for depicting measurable library inputs and outputs in the context of indicators of institutional outcomes. In the third and last phase (ending January 2002), the study team concluded its work on outcomes issues along with the other remaining components of this project.

The study process began with a review of literature concerning library and institutional assessment to better understand what other efforts had accomplished, with an eye toward finding documented linkages between library outputs and institutional outcomes. We found that, while the problem was clearly defined and its significance well appreciated and often noted in the literature, there has been little work toward actually identifying linkages and developing models that ARL member libraries could use to determine how to best measure their impact on the outcomes of the universities they support. Accordingly, the study team undertook laying a foundation upon which such efforts could succeed as research progresses.

This paper reflects and reports on the study's efforts and findings to date; discusses our current process framework for approaching the issues and practices of institutional outcomes assessment and support in academic and research libraries; and raises continuing questions and issues that should be considered at individual libraries and in future research, particularly with respect to the organization's cultural context where outcomes assessment occurs.

Background and Methodology

An important component of E-Metrics project involved developing a framework and graphical model that can ultimately link the study's proposed network statistics and measures to: (1) educational, research, and service outcomes in higher education institutions; and (2) educational, research, and service outcomes in higher education libraries. In order to engage in this task it was important at the outset to specify a working definition of the key term "outcome" as it has varying meanings for different users in different contexts. As a working definition that captures various related aspects of the term "outcome," we have used the following:

> An ***outcome*** is a clearly identified result or end product that occurs as a consequence of individual or combined activities

> from units at the institution. It is a preferred or desired state and ideally clarifies specific expectations of what *should* be products from the institution. An institutional outcome can be defined and measured in such a way that evidence is available to determine the amount or degree to which the outcome does, in fact, occur.

We found it particularly important to distinguish between outcomes of interest, desired outcomes, and actual outcomes. Among the myriad if not infinite outcomes of the research university enterprise (i.e., its results; that which "comes out" of a university in a mechanistic sense), ***outcomes of interest*** are those outcomes—relatively few in number—on which a particular university chooses to focus its attention at a given time, taking into account the complex, ever-changing array of relevant, local values. Of great significance, these outcomes must not only be important to the university's leadership and constituency, but they must also be ones the university determines it can impact *and* measure meaningfully.

For the selected outcomes of interest, ***desired outcomes*** are the aspirational levels of achievement or production an institution sets in advance to determine whether it has attained success at a future time on some important dimension of its operation. In other words, they are specific goals or quality standards for outcomes of interest. ***Actual outcomes*** are the real achievement or production levels for an outcome of interest as measured at a given time.

Our work in this aspect of the E-Metrics project began with an extensive literature review, a summary of which follows this section and highlights some of the key work identified in the area of outcomes assessment. We also conducted a content analysis of selected ARL member strategic planning documents at the library and institutional levels. This analysis revealed a number of commonalities in the institutional goals of ARL members and the manner in which those goals are devised and articulated. With the insights gained, in addition to prior work in this area by the team, we conducted structured interviews in order to solicit feedback, identify key work and actors in the field, and ground our framework development in (a) related efforts already underway and (b) the concerns of representative participants.

Altogether, these efforts substantially informed initial attempts to create an analytic framework and depict an idealized institutional process focused on key institutional outcomes of concern to university administrators that can be impacted by libraries. An earlier version of this paper was drafted to convey the framework developed to date. It was distributed early in April 2001 to stimulate constructive dialogue on the listserv for project participants and at a project discussion forum held during the CNI Spring Task Force Meeting on April 9, 2001.

With this foundation, the study team refined its working framework by then employing other methods to approach the complex issues at hand, including: (1) a discussion forum; (2) site visits; (3) a policy analysis of accreditation standards; and (4) a survey of ARL deans and directors, including their relevant strategic planning documents. A summary of our findings from these efforts follows in a subsequent section, and an overview of all methods employed is in Figure 1.

Figure 1

Methodologies for Institutional Outcomes Framework Development	
Technique	**Function/Purpose**
Content Analysis	Gather various documentation and reports to review development of current outcomes-oriented requirements, strategic plans, activities, and future directions at a variety of ARL institutions, including project participants.
Discussion Forum	Explore key issues identified to date regarding understanding and assessment of library and institutional outcomes. Findings informed broader and ongoing data collection activities and framework development.
Policy Analysis	Identification and review of policy instruments adopted or under consideration by accreditation bodies, with a focus on institutional outcomes assessment requirements. Findings helped to inform an understanding of regional and national trends in an area critical to all ARL members and institutions of higher education.
Site Visits	Extensive interactions and observations of institutions selected for in-depth study. Findings were critical to contextualizing and integrating insights gained from individual case documents and interviews, as well as for making significant refinements to the process framework.
Structured Interviews with Small Groups and Individuals	In-depth exploration of outcomes-related concerns and activities with key informants at selected institutions and their libraries, including site visits.
Survey of ARL Membership	Uniform collection of responses to open-ended questions regarding outcomes-related concerns and activities at academic ARL institutions and their libraries.

Other projects within the ARL New Measures Initiative have pursued parallel inquiries into many of the outcomes-related issues explored in the E-Metrics project (see <http://www.arl.org/stats/newmeas/newmeas.html> for more information on the Initiative). Of particular note, the study team benefited from the work done by Ken Smith, who is investigating educational outcomes for university libraries, and Doug Jones, who is studying education and research outcomes for university libraries, (see <http://www.arl.org/stats/newmeas/outcomes/heo.html> for more information). Their work helped us better understand the role electronic and networked services play in these areas. Likewise, the work being done to study user perceptions of quality in the LibQUAL+ program has been of keen interest and explored for possible connections (ARL, 2001).

For the same reason, the study team investigated work done outside of ARL's New Measures Initiative. One interesting study of the library's impact on sponsored research funding conducted by Brinley Franklin found that "electronic services use supporting sponsored research generally mirrored the same level of support exhibited by the general use of library materials and services at almost all types of libraries" (Franklin, 2001). Franklin also found "a high correlation between total research and development funding at an educational institution and total library expenditures at research universities." This work suggests that electronic services use be quantified to reflect the degree to which a library's investment in electronic services supports specific institutional outcomes.

Finally, outcomes-related issues have been a growing interest to a variety of library and information professionals lately as well as university administrators. Therefore, we have included a list of some other outcomes-related efforts and resources—and Internet links where appropriate—for those interested in pursuing the topic further (see Appendix A).

Selected Literature

McClure and Lopata (1996) found that measures of teaching, learning, and research in higher education were generally inadequate, making it more difficult to assess the impact of networked services in those areas. Library administrators "must rely on intuition and anecdotal information as a basis for assessing the usefulness and value of a particular service" (p. 3). Without appropriate measures of impact, library administrators are less able, or in some cases unable, to justify expenditures for networked services. Additionally, they found feedback mechanisms allowing administrators to improve networked services for users are weak.

Pritchard (1996) also calls attention to the "lack of performance measures that make sense across institutions and that link library processes to educational and research outcomes" (p. 591). She notes that as university administrators begin publicly questioning the need for conventional libraries, it is vital that libraries are able to link their information resources to the effectiveness of academic programs (Pritchard, 1996). One approach that may be helpful in doing this, she points out, is Total Quality Management, which can be used to improve the processes of university libraries (p. 590).

In Finland, where in the early 1990s publicly funded institutions moved away from traditional budgeting to performance-based budgeting, libraries have needed to produce evidence of their contribution to university performance (Kokkonen, 1996). "Though the ultimate result of good library performance is part of good overall performance of the university's teaching and research functions, it is evident that the methods developed from the evaluation of teaching and research are not suitable for measuring library performance" (Kokkonen, 1996).

In a report of the America Association of Higher Education's 53rd National Conference, Simoneaux and Miller (1998) stated that the provosts in attendance generally saw the value of libraries in terms of supporting learning and information literacy, but that the high cost of information resources and technology was a major concern. The ACRL "Standards for College Libraries 2000 Edition" shows sensitivity for this concern by stating that outcomes assessment "should take into consideration libraries' greater dependence on technology, their increasing use of online services, their growing responsibility to provide information literacy skills, their increasing reliance on consortial services, the possibility of dwindling financial resources for collection development, and new ways in which scholarly information is published and distributed" (ACRL, 2000).

Smith (2000), in a paper prepared for ARL, states that outcome assessment for the library should be treated like any other academic department. "Like the Physics department, the Library should be able to contribute to the achievement of learning outcomes for various academic programs across the University" (p. 9). He suggests that a step in the right direction might start with the library asking its partners in academic departments to help it determine how best to support and achieve learning outcomes and then tailor the roles of its professionals accordingly.

The ACRL Task Force on Academic Library Outcomes Assessment was charged with, among other things, "developing a philosophical framework for assessing libraries in terms of desired campus outcomes" (ACRL, 1998). It viewed outcomes as "the ways library users are changed as a result of their contact with the library's resources and programs" (ACRL, 1998). The Task Force reports that, while libraries should be concerned with outcomes, measurement is difficult and that the rigor involved in linking inputs to outcomes will require much research (ACRL, 1998).

LibQUAL+, which adapted and built upon SERVQUAL for the research library community, calculates the gap scores "between *minimum* and *perceived* expectations and *desired* and *perceived* expectations" (Cook et al., 2001). By identifying areas that users say are below their minimum expectation, libraries can begin to address problems both of user perception and library quality (Cook et al., 2001). While measuring outcomes directly is more difficult, an instrument like LibQUAL+ could be developed to measure perceived outcomes.

The work of Cullen and Calvert (1995) examines, among other models, the constituency satisfaction model. The researchers developed a questionnaire that asked stakeholders to rate the usefulness of 99 indicators, which were determined through a review of the literature. Means were taken and the indicators were ranked for each constituent group. Lindauer (1998) found that there was overlap between the Cullen and Calvert findings and the impact measures listed in McClure and Lopata's 1996 manual and used both in her work.

Lindauer presents a useful framework for assessing the library and its networked services in terms of institutional outcomes (1998). Her framework depicts the foundational role that infrastructure plays and shows the importance of student learning outcomes in a teaching institution by placing them above other domains. Meanwhile, Orr (1973) discusses the basic internal processes of the library. These particular works have been of significant interest and help to us in this project and is much of the basis for our graphical modeling.

Lindauer has also produced an outcomes assessment manual to "offer guidance for improving the measurement and documentation of the impact of community college library and learning resources programs" (2000, p. 2). This manual employs a core assessment method Lindauer identifies as "ADICAC": Align, Define, Identify, Chart/Collect, Analyze, and Communicate. The ADICAC process, though, designed specifically for community colleges, could be modified to function as an assessment methodology for research university libraries.

Hernon and Dugan (2002) describe outcomes assessment in their recent book *Outcomes Assessment in Your Library*. A primary focus of the book is the answer to the question "How are users of our library changed as a direct result of their contact with our collections and services?" (p. x). Given that focus, the book presents a variety of approaches for libraries to consider in planning, understanding, and undertaking outcomes assessment in their library settings. The book encourages an end-user and library focus and, thus, does not necessarily provide a means through which academic libraries can link their services and resources to the larger university institution. The tools, best practice examples, and other material in the book are useful, however, to libraries that wish to consider developing a user-based outcomes assessment approach for their library services.

The literature reflects that underlying the operations of a research library are the core values and goals of its larger institution. In order to know whether the values are served and the goals achieved, we cannot merely rely on counts of networked resource use. Rather, it is critical that measurements in the library context be done strategically with an eye toward fulfillment of institutional goals.

Findings

This section contains additional detailed sets of findings from four major techniques of data collection employed in this study: a discussion forum; the site visits; the policy analysis and review of accreditation standards; and the survey of ARL member deans and directors. Additional materials in the appendices supplement the latter two subsections.

Discussion Forum

During the Coalition for Networked Information Spring Conference, April 2001, the study team conducted a number of discussion groups and individual interviews regarding issues related to institutional outcomes and the role of such outcomes in terms of library planning and evaluation. The following represent a brief summary of the key issues identified during these meetings that have ongoing significance.

Clarifying Outcomes versus Goals. Some considerable discussion occurred regarding the similarities and differences between the terms "institutional outcomes" and "institutional goals." There is a need to resolve these definitional issues and to differentiate the notion of institutional outcomes from goals and objectives.

Ambiguous/Meaningless Outcomes Statements. A number of participants commented on the use of institutional outcomes statements that were essentially meaningless since they had not been adequately defined and/or operationalized. An example given was that the president of one university had stated her desired outcome is to be the best research university on the West Coast. The participant commented that such statements were not meaningful because the president did not offer a basis for determining when the university would in fact satisfactorily achieve this outcome.

One-to-One Linkages between the Library and Institutional Outcomes. There was considerable skepticism on the part of a number of participants that specific individual activities of the library could be shown to be a major or direct link to a specific institutional outcome. Some participants thought that for many instances the library's role would be more indirect or as a supporting service that contributed to institutional outcomes in very "roundabout" ways.

Concern about Linking Library Inputs to Institutional Outcomes. One participant noted that she worked at a university library with a relatively small (compared to other ARL libraries) collection count/size. Nevertheless, the university was ranked in the top 20 of all institutions receiving federally funded research grants. She stated (and others agreed) that direct relationships between library input and process measures and institutional outcomes could "backfire" on library administrators if such relationships were inverse. Arguments that more library inputs (however defined) would naturally improve the accomplishment of institutional outcomes should be carefully considered before being put forth to university administration.

Comparisons and Peers. There was some discussion that comparing a specific ARL institution in terms of accomplishing certain outcomes may not make sense unless there is an agreed-upon peer group. Simply being an ARL institution does not, in and of itself, provide enough homogeneity to make such comparisons. Furthermore, there is an inherent desire on the part of members of the Association of American Universities (AAU) to compare themselves (positively) to other institutions. The following concern was raised: Will institutional outcomes become another "tool" to compare one university to another—oftentimes with dysfunctional results?

Importance of Process in Setting Institutional Outcomes. There was a general sense that ARL libraries needed to develop a process to identify and operationalize library outcomes that contribute to institutional outcomes. The library is critical in informing the university of "appropriate" institutional outcomes to which the library contributes. Setting such a process is an important method for informing key stakeholders in the university of both the library's role in institutional outcomes and insuring that the institutional outcomes to which the library has (or may have) links are appropriate. Some participants thought that the study team might make an important contribution to the project by suggesting how such a process might be developed.

Importance of Situational/Institutional Factors. There was wide agreement that a useful outcomes model ultimately needs to recognize the wide range of situational and institutional factors that might affect the role of the library in the development of and impact on institutional outcomes at a particular campus. Situational and institutional factors that may be relevant include:

- Different missions of the university, including missions that might evolve from state legislatures and other external factors;
- Process by which resources are allocated across campus;
- Importance placed on institutional outcomes and how they are defined at a particular institution;
- Culture and traditions for roles and responsibilities of faculty, etc.;

- The physical location of the university, especially in terms of a urban versus non-urban setting;
- Organizational structure and governance structures of both the library and the larger institution;
- Planning process;
- Role and extent of branch and/or departmental libraries on campus;
- Faculty involvement in library governance through a faculty senate library committee, etc.;
- Technological infrastructure and management of that infrastructure; and
- "Responsibility-based budgeting" of units in which each unit accounts for its own income versus expenditures.

Clearly there are likely to be a significant number of additional situational and institutional factors that would vary from university to university. The degree to which any model can take into consideration the range of situational and institutional factors may be problematic.

Point-of-View Toward Outcomes from Different Stakeholder Groups. What might constitute institutional outcomes, or *appropriate* institutional outcomes, will vary from one group to another (deans, faculty, trustees, students, etc.). It could be that the outcomes from the library (as agreed-upon by library staff and administration) may or may not be those seen by university administration as important or appropriate. Is there some type of hierarchy of outcomes from different units in the institution as opposed to the institution overall? The trick to institutional outcomes is that they should be end results that *all* units of the institution have a stake in achieving—not just the library.

If/Then Models to Depict Libraries and Institutional Outcomes. There was some support for developing multiple models for the depicting the relationships between libraries and institutional outcomes. For example, IF the library had certain situational and institutional factors, THEN the model linking activities to institutional outcomes would be different for a library in that situation than one that had differing situational and institutional factors. To pursue this possibility would require a better understanding and operational description of specific situational and institutional factors that, perhaps as a menu of possible factors, *could* affect the way in which the library is associated with institutional outcomes.

A Menu of Possible Outcomes. Some participants thought that it would be useful to identify a menu of possible institutional outcomes from which an institution might select those outcomes of interest or importance to them. For example, one outcome is "high research productivity" and could be measured by the institution's ranking of amount of federally funded research obtained per year. Libraries (and institutions) could then select the outcomes that were most appropriate for their particular situations. An interesting example of how one institution, Ohio State University, has articulated its goals, outcomes and indicators of achievement is in that university's "Strategic Indicators – 2001: Executive Summary" (available at <http://www.rpia.ohio-state.edu/Strategic_analysis/strategic_indicators/2001/Exec_Summary.pdf>).

Joint Activities/Roles between the Library and other Institutional Units. Participants believed that oftentimes direct linkages from the library to a specific institutional outcome might be difficult to identify and measure. Some suggested the possibility of identifying *groups* of institutional units that might all be working toward a specific institutional outcome. Such might be a better approach for the library to be linked to outcomes rather than considering a library activity as a single factor in producing an outcome.

The issues briefly described in this section are not intended to be a comprehensive listing of those identified and discussed by the various participants in the meetings. They do, however, suggest the extent to which (a) sufficient understanding of institutional outcomes, (b) the relationship of institutional outcomes to library activities and outcomes, and (c) how an outcomes focus should be used in planning/evaluation of library services, requires much additional thought and research.

Site Visits

During the week of May 21, 2001, two members of the E-Metrics project team conducted site visits at the University of Arizona (UA) and Arizona State University (ASU), particularly at their main libraries. Exploring issues from both institutional and library perspectives, the visits focused on better understanding the manner in which each university: (a) sets its strategic direction with both institutional and library outcomes of interest; (b) articulates those outcomes and the results desired; (c) assesses whether the desired outcomes have been achieved; and (d) uses outcomes-related concerns and data in decisionmaking.

On both campuses the team conducted a number of in-depth interviews and group discussions, with both a variety of line and administrative librarians, as well as with senior university planning officers. In addition, they were able to review and discuss a wide range of relevant documents, many of which were collected for further review and analysis. Finally, they benefited from observing library activities at both locations.

The study team gained great insights into both institutions from very helpful informants who were without exception extremely generous with their time and contributions. Moreover, it provided an opportunity to update members of both universities with project developments, and involve them intimately in this component of the project. Significant interest and enthusiasm were expressed throughout the week in this study's focus on outcomes, with a strong hope that this investigation continue to advance the issue of a research library's role in university outcomes by further framing the discussion and pursuing the inquiry.

The study of these institutions, separately or together, was not an end in itself, and neither was in any way evaluated. Rather, both were selected as two patently different organizations within the same state university system, providing an unusual opportunity for making comparisons and identifying contrasts.

The University of Arizona Library is well known for having undergone a major reengineering nearly a decade ago by implementing an extremely flat organization managed almost entirely by teams. While the teams themselves are arranged in a structure with some formalities that have evolved (and continue to evolve), and the dean operates within the larger structure of the university, every individual staff member has the opportunity and the expectation to participate—at one time or another—in virtually every facet of library operations. One of the hallmarks of this approach is the overt empowerment of each individual with corresponding responsibilities, and mutual reliance on everyone else exercising his or her team-based power responsibly. What is more, everyone interviewed or observed—regardless of regular job duties or position—was mindful of and conversant with the full array of the library's strategic and operational issues, including budget details, short-term objectives, and long-term goals.

As with all human endeavors, there are always inefficiencies and uncertainties. Along with many instances of routine progress made through unusually egalitarian methods, the team also observed a fair amount of time expended on inter- and intra-team monitoring and adjustments, orienting and reorienting. This was not necessarily counterproductive, but it appeared that the absence of explicit goals, directions, and standards from the top down resulted in much confusion from the need to generate such from the bottom up. By and large the uncertainties and confusion were viewed as an investment in a continuously learning organization where every individual, ideally, is highly knowledgeable and focused on quality customer service and the organization's greater good (i.e., the university's outcomes of interest).

The organizational structure of the Arizona State University Libraries is relatively traditional with a hierarchy of administration and departments and line staff; and yet there are teams within the more traditional structure and other instances of flexibility or experimentation as situations warrant or seem worth exploring. In contrast with the fluid UA Library, the ASU Libraries seem mechanical with a top-down management system. But this is not a pejorative characterization as a general matter, and the observations of ASU's more familiar operation mode did not suggest anything other than a well-run system.

While the traditional hierarchical system has become associated in the minds of many with the negative connotations of bureaucracy, that is a misleading image and disguises significant efficiencies when the system is well managed. A more rigid structure with well-established and clearly communicated goals, directions, and standards can be quite empowering for employees at any level, albeit in a different sense from that of a flat organization. Line employees can focus on their particular jobs and not on being an integral part of managing the organization. And that appeared to be the case at ASU. Moreover, the organization's managers are mindful of the university's mission, values, and outcomes of interest, which are conveyed throughout the library even if every line employee is not conscious of it in the same manner as those at the UA Library.

The key insight regarding the outcomes framework development that arose out of the site visits was that, notwithstanding the obvious—and in ways profound—differences, both universities invest a very high importance in the library deans. The deans' role and the way they exercise it is not to the exclusion of the importance of other library staff, for all interact in one way or another with various campus customers and stakeholders, and the staff are at the heart of the day-to-day operations. But the deans are the public and official champions of the library on campus among other deans, the provost, and the president.

The administrators at both universities apparently convey to the library an appreciation (or assumption) of the library's role in contributing to the larger institutional values, and rely on the library deans to present the achievements and contributions of their libraries in a manner the deans deem appropriate. Thus, our understanding is that in both cases the library deans are free to present the library to senior administrators and peers in whatever manner argues best for what the library does to contribute to its university, without any imposed requirements as to substance (although the ASU administration has directed via memorandum all departments, including the library, to tie budget requests to the university's strategic plan).

This is highly significant: at present these two very different library organizations are similarly situated vis-à-vis presentation of the library as a whole to the academic community it serves. The deans and associated staff must define the library—and redefine it continually as their local and larger environment evolves; they must make their contributions to their respective communities, ultimately in terms of current outcomes of interest; and they must demonstrate how they are actually contributing to the achievement of desired outcomes. But in the absence of internally imposed measures, and in the absence of widely recognized measures that supports such a demonstration, clear linkages between library resources and services—electronic, networked, or otherwise—and the institutional outcomes they must ultimately support, remain unspecified. ASU and UA share this situation. They also seem to share the same solution: excellent communication of what the library does.

Accreditation Review

The study team engaged the services of Bonnie Gratch-Lindauer to follow up on one aspect of her previous work (Lindauer, 1998) and conduct a review of relevant accreditation standards as they relate to outcomes and networked services (see Appendix B for background on the methodology employed and the documents reviewed). For her review, the major focus was to help illustrate: (1) the need for research university libraries to demonstrate the outcomes of electronic and networked services; (2) the need for such libraries to demonstrate any outcomes apart from electronic and networked services; and (3) the need for research universities to show the connection between the use of electronic and networked services and the fulfillment of their missions/goals.

With regard to the need for research university libraries to demonstrate the outcomes of electronic and networked services, the standards and supporting documents contain few references to electronic and/or networked resources and services. Only five instances of the terms *network* and/or *electronic resources and services*—or similar terms such as *electronic bibliographic databases* or *online catalogs*—were found. However, relatively general but related terms like *information resources and services*, *information technology resources and services*, or *information technologies*, were more commonly used in context. This broader terminology clearly includes electronic and networked resources and services, and its increasing importance in accreditation standards underscores the growing expectation that academic libraries demonstrate how these resources and services support student learning and faculty research.

Regarding the need for libraries to demonstrate any outcomes apart from electronic and networked services, the emphasis on assessing student learning and other outcomes is generally stronger in those standards that have been or are currently undergoing revision since 1998. Moreover, as the Middle States Commission on Higher Education detailed, Title IV of the 1998 Higher Education Amendments requires universities receiving federal monies to have an outcomes assessment plan that includes "a review of the institution's success with respect to student achievement in relation to mission. Institutions should include in the self-study a review of course completion, graduation rates, state licensure exam pass rates, and other data as appropriate to the mission of the institution and the programs it offers" (Middle States, 2000, p. 32).

As for the need to show the connection between the use of electronic and networked services and the fulfillment of missions/goals, the findings were that, while there may not be a need to demonstrate the *outcomes* of electronic and networked resources and services, there is a need to provide evidence that documents the *connections* between their use and fulfillment of the institution's goals. Four of the documents reviewed support this. Lindauer also found that university libraries need to make more explicit and public the connections between the following:

a.) How their resources and services support institutional goals (in some of the standards, appraisal of annual institutional goals and progress in their accomplishment is suggested as a type of evidence contributing to institutional effectiveness);

b.) How their resources and services are used, by whom, and the effects or impacts of this use; and

c.) How their strategic plans and assessment plans support the institution's planning documents and assessment process and how the findings of the library's assessment activities contribute to the achievement of the institution's mission and goals.

The key observations from the review are as follows:

1. The majority of the outcomes and outcomes-related statements that refer to libraries and information resources are located in sections of the standards that deal with the education program and institutional effectiveness.
2. The use of library and information resources is connected to student learning outcomes in four of the documents, and evidence, such as inclusion in course syllabi and integration of library use into the undergraduate curriculum, are offered as measurable indicators for assessment purposes in two of the documents.

3. The university library's role in helping students develop information literacy skills is an important student learning outcome referenced in four of the documents and in the "Best Practices for Electronically Offered Degree and Certificate Programs," endorsed by the accrediting commissions.

4. Assessing student needs, perceptions and levels of satisfaction with educational support services (i.e., library and information services) and demonstrating that the findings from these user studies are used for program improvement are fundamental expectations of all the regional accrediting commissions.

5. Appraisal of annual institutional goals and progress in their accomplishment is suggested as a type of evidence contributing to institutional outcomes, or in some of the documents the phrase used is "institutional effectiveness."

6. All of the standards describe the need for institutions to have an assessment or evaluation plan and to document that the findings are utilized for program improvement. Some of the documents clarify this requirement to mean that each program or unit should have an assessment plan.

7. Several of the documents refer to the campus climate or the institutional environment that supports teaching and learning. Three specifically connect library and information resources and services to the quality of the learning environment. The implication is that university libraries should clearly describe what resources and services they provide that directly support the learning environment, how these are used and with what effects on students and faculty.

The role of accrediting bodies is widely acknowledged but its import cannot be overstated. First, there is the obvious matter of gaining or maintaining accreditation with a regional commission, as the failure to do so would supersede all other organizational concerns. Secondly, their increasing focus on outcomes assessment could be a bellwether for more requirements of systematic outcomes measurement and outcomes-based justification from a range of stakeholders, including universities and state legislatures.

Survey of ARL Members

As part of the data collection for the outcomes portion of the E-Metrics project, a Web survey was posted on the ARL website in June 2001, with a request sent to the ARL membership asking for academic members' responses to six open-ended questions; the survey also solicited any supporting or amplifying documents relevant to the issues raised (see Appendix C for the survey instrument). Given the nature of the survey, the study team was pleased to receive nineteen excellent responses, many including documents sent separately or by identifying appropriate URLs on the Web. The responses represented a cross-section of the membership, revealing a variety of insights, circumstances and perspectives that underscore the importance of this inquiry as well as its complexity.

The following two lists contain a series of insights and conclusions drawn from the survey as a whole. The first list pertains to the university level, while the second focuses on the university's library. (A discussion of selected responses to each question may be found in Appendix D.)

Regarding the university:

- University mission statements tend to be rather similar. All such statements submitted for this survey contain education, research, and service components.
- Most university strategic plans make some mention of the library, particularly with regard to information technology and electronic resources in support of teaching, research, and learning.
- Several universities have goals statements that either apply to, or make mention of, the library, especially regarding increasing information literacy of students and supporting academic programs and faculty research.
- The documents reviewed, for the most part, do not contain outcome statements per se, but typically state a vision for the university and goals that describe an ideal or future state of the university.
- No document reviewed mentioned specific ways to assess programs or units on campus. It may be that this kind of information would be found in other university documents or that assessment tends not to be a high priority on campus, at least not at the detail level in the responding institutions.
- At universities where money is especially tight, the university seems to be more focused on budget justification. At such a university the library is typically expected to demonstrate how it helps the university toward its mission.
- Communication from the provost (or other senior administrators) articulating specific goals to the library seems to be vital in maintaining a library that can meet the needs of the campus. Respondents who stated that goals were more vague or not formally articulated seem to be having the biggest struggles with stating their impacts and getting bigger budgets.

Regarding the library:

- Almost every library mission statement included in this analysis stated that the library existed to support the teaching, research, and service mission of the university.
- Many libraries' vision statements expressed an increase in the amount of information technology and electronic resources owned and used by the library, and asserted that this would help them better serve customers.

- As one library pointed out, environment is the most variable factor in strategic planning. Libraries must know their current environment and able to plan for their future environment.

- Many libraries started creating strategic plans in only the last few years, but find them vital for guiding the work they do.

- Many libraries are required to support the goals of the university and use that as a starting point for setting their goals.

- Few libraries have outcomes explicitly stated in their strategic plans. Many, however, do articulate desired states for the library.

- Libraries have to be selective in the resources and services they offer because budgets do not allow them to do and buy everything desired. Some libraries noted that budgets are so low that they have had to cut vital resources (like journals) and services. These libraries see creating a strong digital collection as a way to offer more access and to share resources with other libraries.

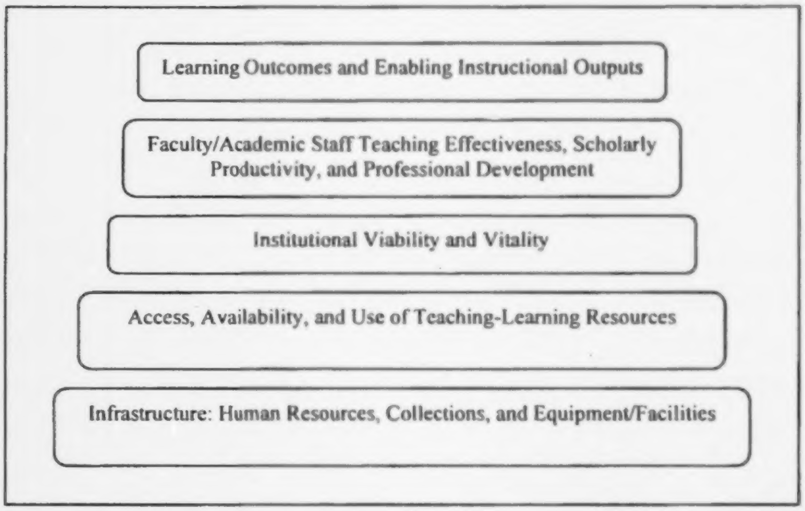
- Libraries are doing many things to support other units on campus. They work to make sure that programs have the necessary information resources, work with new programs to get resources in place, go into classrooms to teach information literacy/research skills, and help faculty create digital collections.

Many of these conclusions concern similar topics also identified in the discussion forum findings.

Discussion

Lindauer's study (1998) particularly informed earlier versions of a graphical model that was distributed for discussion in a preliminary version of this paper at the 2001 CNI Spring Task Force Meeting of the ARL E-Metrics project participants. In her articles, Lindauer describes five assessment domains for libraries and connects goals of the university with activities and measures within the library. Assessment domains for the teaching-learning library that she listed in her article include: (1) learning outcomes and enabling instructional outputs; (2) faculty/academic staff teaching effectiveness, scholarly productivity, and professional development; (3) institutional viability and vitality; (4) access, availability, and use of teaching-learning recourses; and (5) infrastructure—human resources, collections, and equipment/facilities (see Figure 2 below, from Lindauer, 1998, p. 557).

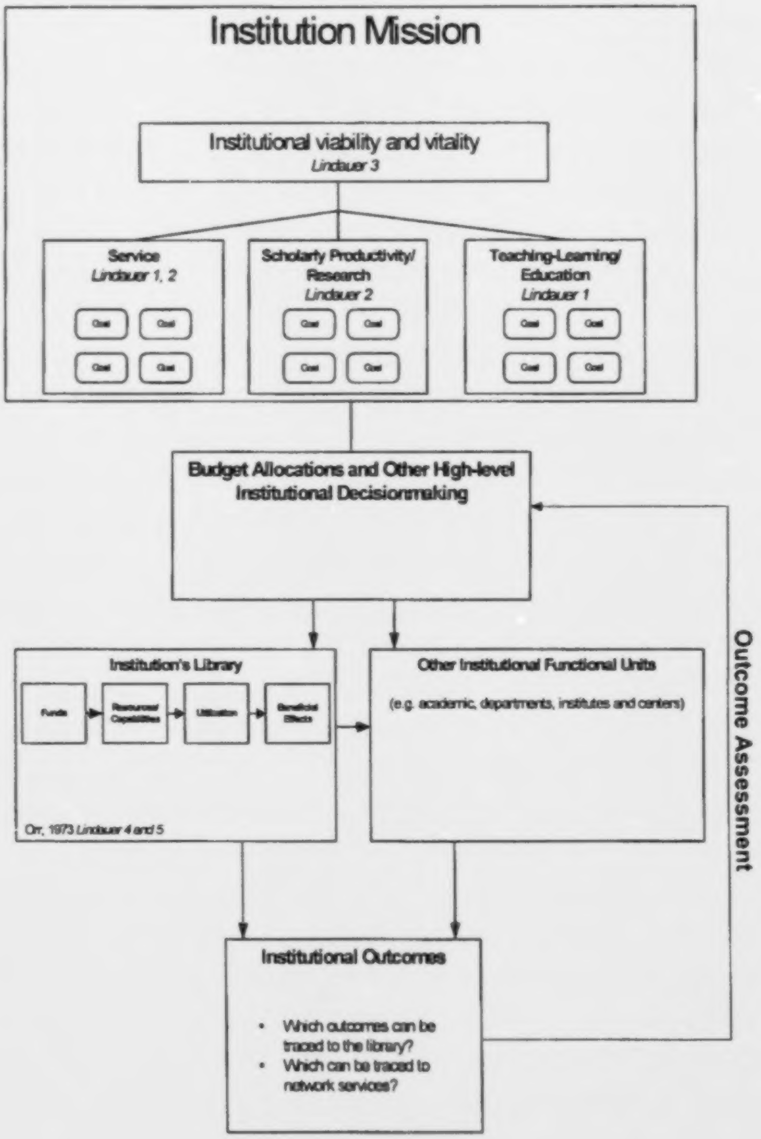
Figure 2. Assessment Domains for the Teaching-Learning Library


Learning Outcomes and Enabling Instructional Outputs
Faculty/Academic Staff Teaching Effectiveness, Scholarly Productivity, and Professional Development
Institutional Viability and Vitality
Access, Availability, and Use of Teaching-Learning Resources
Infrastructure: Human Resources, Collections, and Equipment/Facilities

Our initial graphical model began to depict the process by which an academic research library helps meet the goals of particular departments and functional units within a university, which in turn contribute to institutional goals, while acknowledging that libraries may also contribute more directly (see Figure 3, where "Lindauer 2," for example, refers to the second of Lindauer's assessment domains, counting from the top down in Figure 2). In our earlier model, this idealized process begins with the university administration, which, from a standpoint of maintaining viability, vitality and core values, conceives goals that are articulated to the institution's various academic and support units. From these goals and the needs of the various units, decisions about budget allocations are made. The library receives funding, gains awareness of the needs of the university generally and of other campus units, and makes decisions about which resources and services to purchase and offer its patrons.

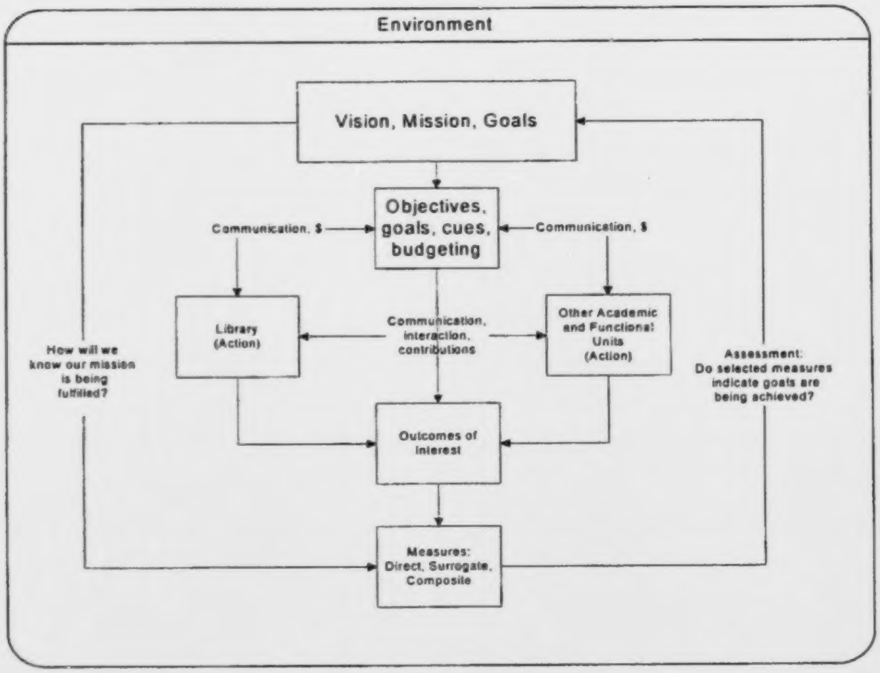
We hypothesized that there is an explicit or otherwise tacit expectation on the part of the library and university administration that—in the absence of feedback to the contrary—actual investments in the library, and customer use of library resources and services, match with the values and goals of the institution, and meet the needs of other academic units. In the ideal case, beneficial effects result, other units are supported, and the goals of the institution are achieved. Outcomes at the institutional level are measured against values and goals and help shape future goal setting and budgeting decisions.

FIGURE 3. Initial Graphical Model of the Outcomes Assessment Process


Institution Mission
Institutional viability and vitality
Lindauer 3
Service
Lindauer 1, 2
Scholarly Productivity/
Research
Lindauer 2
Teaching-Learning/
Education
Lindauer 1
Goal
Budget Allocations and Other High-level
Institutional Decisionmaking
Institution's Library
Funds
Resources/
Capabilities
Utilization
Beneficial
Effects
Orr, 1973 Lindauer 4 and 5
Other Institutional Functional Units
(e.g. academic, departments, institutes and centers)
Outcome Assessment
Institutional Outcomes
Which outcomes can be traced to the library?
Which can be traced to network services?

Based on substantial constructive input from many participants in this project, the current graphical depiction of the outcomes assessment process is a refinement of the same underlying framework (see Figure 4). Although it does not show how *particular* services and resources contribute to outcomes, the model does describe how a library dean or director can begin thinking about targeting library services toward the outcomes of interest to the university, and measure their contributions and impacts more effectively in actual outcomes. Libraries' contributions to actual university outcomes will typically be indirect and/or partial; thus, actual outcomes at the university level will not necessarily give a clear indication of achievement (or not) of success from the library level. Linking measures to outcomes cannot be done without first considering what outcomes are desired and what effects achieving those outcomes could have. Library personnel can then explore surrogate and/or composite measures that are accurate and reliable indicators of actual outcomes of interest.

FIGURE 4. Current Graphical Model of the Outcomes Assessment Process


Environment
Vision, Mission, Goals
Objectives, goals, cues, budgeting
Communication, $
Communication, $
Library (Action)
Communication, interaction, contributions
Other Academic and Functional Units (Action)
How will we know our mission is being fulfilled?
Assessment: Do selected measures indicate goals are being achieved?
Outcomes of Interest
Measures: Direct, Surrogate, Composite

University research libraries are established to support the broad research, education, and service goals that are fundamental to the mission of the institutions they serve. Beyond helping to fulfill the university mission, a research library must be able to help the larger institution reach its more concrete but shifting goals. These goals may be articulated in strategic planning documents, in conversations with the provost or academic deans, in fulfilling regional accreditation standards, or in state legislation.

It is important to be highly aware of these goals and to be able to target library resources, services, and programs to help meet institutional goals. Doing so is critical to the university research library being seen as a vital, contributing part of the university. To address these goals and measure them effectively, it is important to ask three key questions:

1. What is the desired operational state of the university?
2. How can the library help the university achieve this state?
3. How will the library know when it has been successful in helping the library achieve this state?

The first question helps the library better understand its operating environment. Knowing what the university wants to be now and in the future helps library administrators understand what customers need.

The second question helps in making decisions about which of the many goals of the university are helpful for the library to focus on. In addition, answering this question helps the library make decisions about what action it must take to contribute to the fulfillment of those goals. Existing services and programs may address them, programs may have to be fine-tuned and resources upgraded, or new programs and resources may need to be developed and acquired.

The third question helps the library craft the measures that will provide indications of success. This is extremely important and must be thought about carefully because direct outcomes measurement is often difficult or impossible. It may be necessary to develop several measures that work together to indicate an outcome state or to use surrogate measures such as perception surveys. One framework for developing such measures is described below.

The order in which these questions are addressed is also vital. Before measurements can be derived, library administrators must know what they want to measure and how the library's impact is likely to occur. Without this perspective and focus, outcomes measurement cannot be targeted and loses meaning. In other words, it is very difficult to gain useful insights about outcomes when measures are not designed with outcomes explicitly in mind.

ARL libraries may currently collect measures that can provide some indication of success of a particular program or service provided to customers, such as user satisfaction surveys; however, it is important to think broadly—with the desired state in mind—and not simply use the measures on hand because they are easy to collect or because a lot of time and effort has been devoted to collecting them.

In most cases, a single measure on its own is not enough to indicate whether a research library is successful in a given area. To accurately assess the success or quality of an academic library, measurement should be implemented at three key levels:

- Outcome Level;
- Use/Capacity Level (Output); and
- Resource level (Input).

Figure 5 lists some of the important questions that may be answered at different levels of measurement.

Figure 5. Using Measures to Answer Questions at Different Levels

Outcome Level	Use/Capacity Level (Output Measures)	Resource Level (Input Measures)
What are the results of a program or process?	How much is a service, resource, or program being used?	What do we need to ensure success?
How successful or effective is the library?	Who is using a service, resource, or program?	What funding level is appropriate or necessary for a particular program?
How effective do customers perceive your programs to be?	Why are people using a particular program?	Do we need more of a particular resource in order to have a more effective program?
What beneficial effects are you having on your customers?		
How could a program be changed to better suit the needs of your customers?		

The following example illustrates this approach:

> Imagine that information literacy is a theme for your university. How can you have a meaningful impact in this area? One way might be an effective bibliographic instruction (BI) program that reaches many students. Ask the question, "What would constitute success for our BI program?" Once you have articulated the answer, you can begin to develop measures for the effectiveness of your BI program (i.e., professor perception of student performance before and after BI program, etc.).

It is also important to know how many students can be reached with the program, so capacity and use measures are needed as well. Because the program needs staff and materials need to be created, it is important to have resource measures that indicate what goes into the program and whether more or different resources make a difference in the effectiveness or success of your program.

Here is another example in the networked context:

> Imagine that your university wants to attract a "world class faculty". There are many ways that the library can have an impact in this area. Capitalizing on resources unique to your university is one way to "brand" your library (and in turn university) as having

> expertise in a particular field (or many fields). By digitizing collections and making them widely available, the library can attract scholars all over the world to these materials. As a result, scholars will begin to associate these unique resources with your university and may even be attracted to your faculty. There are many ways to measure whether or to what extent there is a linkage. For instance, you could survey new faculty members and ask if they used your library's materials before coming on board, which materials they used and for what, and whether this influenced their decision to join the faculty.

In this example, it is important to know who is accessing the collection, and which parts of the collection they are using most often. This can indicate which parts the digital collection users are most interested in and what collections may need to be more fully developed. Additionally, it would be helpful to know what resources are devoted to creating this digital collection, and if increasing, changing, or upgrading resources has an impact on the desired outcome.

Following this approach, however, may lead to the formulation of a wide range of performance measures and statistics. Selection of the precise measures needed to evaluate an electronic resource or service can be especially difficult, even for libraries that have undertaken processes similar to those described above. Therefore, it is important to have a framework to assist in choosing measures to gain insights into the use and uses, management, and reach of networked services and resources in specific areas or across a number of areas.

Challenges Related to the Use of Institutional and Library Outcomes

ARL libraries need to develop a process to identify and operationalize library outcomes that contribute to institutional outcomes. The library must play a major role in informing the university of valued institutional outcomes to which the library contributes. Setting up such a process is an important method for informing key stakeholders in the university of both the library's role in institutional outcomes and insuring that the institutional outcomes to which the library has (or may have) links are appropriate.

At some level, this process will be developed and/or refined collectively over time by the ARL membership and related academic library associations. However, at a fundamental level, the process and implementation is necessarily local, and the need for better orienting internal library operations to external outcomes may be at hand for some institutions.

Because each university has different processes for information sharing, decisionmaking, and mission fulfillment, it is important that each university library identify, understand, and master the established local process. It is a given that libraries must work within their particular organizational framework. Therefore, to maximize contributions to university outcomes, the library must orient itself within its local framework, and apply that situation to its fullest advantage.

An important factor that contributes to an effective understanding of the local situation is sensitivity to the differing points of view of various stakeholder groups. What might constitute institutional outcomes, or appropriate institutional outcomes, will vary from one group to another (deans, faculty, trustees, students, etc.). It may be that the outcomes from the library (as agreed-upon by library staff and administration) may or may not be those seen by university administration as important or appropriate. Developing a process to address these potentially conflicting stakeholder concerns at the local level is particularly vital.

When this component of the study began, we developed and refined a number of questions for use in structured interviews and discussion forums. They were designed to help the study team better understand the general issues and particular circumstances affecting a variety of institutions. However, asking and answering many of the questions will also help libraries when conducting an environmental scan or engaging in a strategic planning process. We include those relevant questions below, somewhat modified:

- Is there a culture of assessment at your university? At your library?

- How does your university articulate its core values?
  - Are these values clear? Defined? Measurable?
  - Are these values clearly articulated in the context of the library?

- Does your university measure itself—its outcomes—in terms of its core values?
  - How?
  - What measures/statistics/indicators does your university routinely collect?
  - How does the analysis of this data reflect the values of the institution?
  - How does your university administration use its outcomes data and analysis to change and improve its operations?
  - How does your university administration use its outcomes data and analysis to articulate need for improvements or changes in the operations of the library?
  - How does your library use university outcomes data and analysis to improve the operations of the library?

- Has the culture of assessment remained constant at your university (and at your library), or has it changed relatively recently?
  - If it has changed, what were the causes of the changes? Does it change often?
  - If it has remained constant, does this reflect rigidity in the thinking of the administration as a whole? Does it reflect helpful stability?

- What does your university expect from the library in terms of contributing to university outcomes?
  - Does the university make these expectations clear?
  - What do they need to know to make them clearer?

- What does your university expect from the library in terms of reporting data?

- How receptive do you believe your university administration is or would be to library reporting based on outcomes assessment?

- Does your library currently focus on campus-wide, university-based outcomes?
  - If yes, how does your library determine which outcomes to focus on?
  - How are you linking or matching the data you collect with those outcomes?
  - How do you identify those relationships?

- How do you see the way you assess your library's performance changing in the next few years?
  - Why?
  - How should it change?

- Assuming your library does not already do so, if your library were to measure and report its data in terms of university outcomes, would that affect the way the library is viewed and funded by your university's administration?
  - If yes, how would it change?
  - Why?
  - How difficult would it be to effect that change?

- What are the key activities that your library does to support the research, education, and service goals of your university?
  - What kind of formal or informal data does the library collect that lets you know you are supporting these goals?
  - How does this play a part in determining the types of resources and services you offer?
  - How could this play a greater role?

- Does your library collect data on its outcomes—and/or on university outcomes—that occur outside the library's domain?
  - If yes, how?
  - If no, is it clear how that could be done at your institution?
  - What obstacles do you know of—or perceive or expect—regarding collecting university outcome data across the campus?

- Looking at our framework, does it meet with your understanding of the way in which your library interacts with the institution in which it sits?
  - If yes, are there any critical details or factors that are missing?
  - If no, what is different at your institution?

We intend and hope that these questions will help to stimulate the process of outcome-oriented organizational change at all academic research institutions.

The Need for New Perspectives and Additional Research

Although the thrust of the E-Metrics project was on developing statistics and measures for academic and research libraries in the networked environment, the study team also investigated institutional outcomes in higher education and the role of the library in facilitating the accomplishment of such outcomes. The study team's work in this area over the past year underscores the need for new perspectives and assumptions regarding outcome-based assessment and the need to continue research in this area. The outcomes framework offered here is a first step.

To some degree, the importance placed on institutional and library outcomes vary by institution and by its stakeholders. Some institutions of higher education believe an outcomes-oriented view toward planning and evaluation is essential—others do not. There are widespread views about the usefulness, application, and need for such an approach. Thus, there is a great need for empirical studies that can pursue a number of the topics and issues outlined in this paper. Such studies could demonstrate to what extent and in what manner higher education institutions (including libraries) can be more effective and have a greater impact (however defined) because of an outcomes-based approach.

Finally, it is important to note that an outcomes-based perspective might best be seen as but one of a number of types of approaches to support planning and evaluation in higher education. Traditional input-output models of statistics and measures, goal-based assessment, service quality approaches, expert-based standards, and others can be used *together* as a means for improving the overall performance of institutions of higher education and their various units. Indeed, additional research that explores how best to integrate these and related approaches might be most fruitful to pursue in the future.

References

Association of College and Research Libraries (ACRL). (1998). "Task Force on Academic Library Outcomes assessment report." Web page. Available at http://www.ala.org/acrl/outcome.html

———. (2000). "Standards for college libraries 2000 edition". Web page. Available at http://www.ala.org/acrl/guides/college.html

Association of Research Libraries (ARL). (2001). "LibQUAL+." Web page. Available at http://www.arl.org/libqual/

Cook, C., Heath, F., Thompson, B., & Thompson, R. (2001). "The search for new measures: The ARL LibQUAL+ project—A preliminary report." Web page. Available at http://muse.jhu.edu/demo/pla/1.1cook.pdf

Cullen, R. J., & Calvert, P. J. (1995, November). Stakeholder perceptions of university library effectiveness. *Journal of Academic Librarianship, 21*, 438-48.

Franklin, B. (2001). "Academic research library support of sponsored research in the United States." Paper presented at the 4th Northumbria International Conference on Performance Measurement in Libraries, Pittsburgh, Penn., Aug. 12-16, 2001. PowerPoint presentation available at http://www.arl.org/stats/north/powerpoints/brinley.ppt

Hernon, P., & Dugan, R. E. (2002). *An action plan for outcomes assessment in your library.* Chicago and London: American Library Association.

Kokkonen, O. (1996). "Performance measurement at national level: Problems of quality approach." Web page. Available at http://vasara.vtu.lt/conference/reports/96052706.html

Lindauer, B. G. (1998). Defining and measuring the library's impact on campuswide outcomes. *College & Research Libraries, 59*, 546-70.

———. (2000). *Measuring what matters: A library/LRC outcomes assessment manual.* [Fairfield, CA]: Learning Resources Association of California Community Colleges.

Middle States Commission on Higher Education (1996). *Framework for outcomes assessment.* Philadelphia, PA: Middle States Association of College and Schools. Available at http://www.msache.org/msafram.pdf

———. (2000). *Design for excellence: Handbook for institutional self-study.* 7th ed. Philadelphia, PA: Middle States Association of College and Schools. Available at http://www.msache.org/msadesig.pdf

McClure, C. R., & Lopata, C. L. (1996). *Assessing the academic networked environment: Strategies and options*. Washington, DC: Coalition for Networked Information.

Orr, R. H. (1973). Progress in documentation: Measuring the goodness of library services: A general framework for considering quantitative measures. *Journal of Documentation, 29*, 315-33.

Pritchard, S. M. (1996). Determining quality in academic libraries. *Library Trends, 44*, 572-94.

Simoneaux, L., & Miller, W. (1998, June). Provosts, libraries, and electronic information: Reports from AAHE and CNI. *College & Research Libraries News, 59.* Web page. Available at http://www.ala.org/acrl/aahecni.html

Smith, K. R. (2000). "New roles and responsibilities for the university library: Advancing student learning through outcomes assessment." Web page. Available at http://www.arl.org/stats/newmeas/HEOSmith.pdf

Appendices

Appendix A: Additional Resources

The following table contains a list of other outcomes-related resources for those interested in reading more about library and institutional outcomes and assessment:

Program/Resource	*Author/ Organization*	*Availability*
An Action Plan for Outcomes Assessment in Your Library (2002)	Peter Hernon and Robert E. Dugan	Chicago and London: American Library Association.
Assessment and Testing: Measuring Up to Expectations.	Christine Cress	http://www.ed.gov/databases/ERIC_Digests/ed391559.html
Assessment in Higher Education	Raymond Walters College	http://www.rwc.uc.edu/phillips/Assessment/HigherEd.html
Basic Guide to Outcomes-Based Evaluation for Nonprofit Organizations with Very Limited Resources	Carter McNamara	http://www.mapnp.org/library/evaluatn/outcomes.htm
Internet Resources for Higher Education Outcomes Assessment	NC State University: University Planning and Analysis	http://www2.acs.ncsu.edu/UPA/assmt/resource.htm
New Measures Initiative	Association of Research Libraries	http://www.arl.org/stats/newmeas/newmeas.html
Perspectives on Outcomes Based Evaluation For Libraries and Museums	Institute of Museum and Library Services (IMLS)	http://www.imls.gov/pubs/pdf/pubobe.pdf
Measuring What Matters: A Library/LRC Outcomes Assessment Manual (2000)	Bonnie Gratch Lindauer	[Fairfield, CA]: Learning Resources Association of California Community Colleges.
Task Force on Academic Library Outcomes Assessment Report (1998)	Association of College and Research Libraries	http://www.ala.org/acrl/outcome.html
Workbook: Outcome Measurement of Library Programs	Division of Library and Information Services, Florida Department of State	http://dlis.dos.state.fl.us/bld/Research_Office/OutcomeEvalWkbk.doc

Appendix B: Accreditation Review Methodology and Documents

The review of accreditation policies conducted for this study involved a content analysis of the standards and pertinent supplemental documentation of the six regional accrediting commissions of higher education that accredit senior colleges and universities. It addressed the following points:

- Identification of overall trends in accreditation affecting libraries and information resources;
- A comparison, with examples of supporting text, of how outcomes are represented, contextualized and operationalized with a particular, but not exclusive, focus on libraries;
- A description of how the reviewed standards and supplemental documentation reference electronic and networked services, particularly the need for university libraries to demonstrate the outcomes of these services and the need to show the connection between use of electronic and networked services and fulfillment of their missions; and
- Observations and suggested recommendations for university libraries based on this review and analysis.

Typically the standards are part of a "Handbook of Accreditation" that contains a description of the process, the eligibility requirements, relevant policies that institutions must address in their self-study reports, and other documentation developed to assist institutions with preparing their self-studies and conducting evaluation and assessment studies. Only the Northwest Association of Schools and Colleges (Northwest) integrates its policies within the standards by locating them at the end of the standard to which they relate. Some of the documents listed below "required" supporting documentation and/or "suggested" supporting documentation after each standard (e.g., Western Association of Schools and Colleges (Western), Middle States Association of Colleges and Schools (Middles States), and Northwest). All of them provide guidance either within the handbook or as separate policies for improving assessment and evaluation of institutional effectiveness and student learning.

The review included both current and proposed draft versions of the standards. Since the time the review was completed, the Southern Association of Colleges and Schools (Southern) was expected to have a near final draft on its website in August 2001 with final approval by December 2001. As of January 7, 2001, according to the official Southern website, its Commission on Colleges adopted the draft in June 2001, and final adoption was scheduled for December 11, 2001; however, no updates on the proposed adoption have yet been posted. Meanwhile, Northwest and the New England Association of Schools and Colleges (New England) Commissions are not currently working on revised standards. Middle States expects to have a final and approved copy by early 2002.

The findings discussed in this paper reflect the text of the standards and pertinent supporting documentation such as policies and related documents. The process of accreditation usually involves several stages for institutions seeking accreditation and re-accreditation. Part of this process involves institutions documenting their compliance with basic eligibility requirements. All of the six commissions' documents reviewed, except that of New England, contain eligibility requirements. Eligibility requirements relating to libraries and networked information sources are typically vague and input-specific. Therefore, it is particularly noteworthy that Western's requirement specifies having programs for student training and instruction in information literacy and that institutions "must also be able to demonstrate that library use is a fundamental part of *all* curricula" (Western, *How to Become Accredited*, p. 4).

The following documents were analyzed for this paper and are listed here by issuing institution:

Middle States Association of Colleges and Schools
(http://www.msache.org)

1. *Characteristics of Excellence in Higher Education*: *Standards for Excellence in Higher Education* (1994). Commission on Higher Education.

2. *Characteristics of Excellence in Higher Education.* (February 22, 2001 Draft).

3. *Designs for Excellence: Handbook for Institutional Self-Study*, 7th ed. (2000).

4. *Framework for Outcomes Assessment.* (1996). Commission on Higher Education.

New England Association of Schools and Colleges
(http://www.neasc.org)

5. "Pilot Institutional Assessment Portfolios." (2001). Commission on Institutions of Higher Education.

6. *Standards for Accreditation.* (1992). Commission on Institutions of Higher Education.

North Central Association of Colleges and Schools
(http://www.ncahigherlearningcommission.org)

7. *Addendum to the Handbook of Accreditation.* 2nd ed. (March 2001). The Higher Learning Commission. www.ncahigherlearningcommission.org. This includes the text of the updated March 2001 "Criteria for Accreditation", current policies and a document called "Assessment of Student Academic Achievement: Levels of Implementation" (updated March 2001).

8. "Statement of Commitment by the Regional Accrediting Associations for the Evaluation of Electronically Offered Degree and Certificate Programs" and "Best Practices for Electronically Offered Degree and Certificate Programs" (Sept. 2000). The "Statement of Commitment..." was developed by the eight

regional accrediting commissions and the "Best Practices..." are based on a document by the same title initially drafted by the Western Cooperative for Educational Telecommunications. Both are located in the North Central Association's Handbook of Accreditation, pp. 44-54.

Northwest Association of Schools and Colleges
(http://www.cocnasc.org)

9. *Standards of Accreditation.* (1999). Commission on Colleges.

Southern Association of Colleges and Schools
(http://www.sacscoc.org/)

10. *Criteria for Accreditation.* (1998). Commission on Colleges.

11. "Distance Education: Definition and Principles—A Policy Statement. (Adopted June 1997; Updated May 2000). Commission on Colleges.

12. *Principles of Accreditation.* (March 2001 Draft). Commission on Colleges.

Western Association of Schools and Colleges
(http://www.wascweb.org/)

13. *Handbook of Accreditation.* (January 2001). Accrediting Commission for Senior Colleges and Universities. This includes the standards, policies and procedures required by WASC.

14. *How to Become Accredited: Procedures Manual on Eligibility, Candidacy, and Initial Accreditation.* (n.d.). Accrediting Commission for Senior Colleges and Universities.

Appendix C: Survey Instrument

Developing Statistics and Performance Measures to Describe Electronic Information Services and Resources for ARL Libraries

http://www.arl.org/stats/newmeas/emetrics/

Survey of Library and University Outcomes

This survey is being conducted by the Information Use Management and Policy Institute (Information Institute) at the School of Information Studies, Florida State University, as part of the E-Metrics Project funded by 24 ARL member libraries. ARL is distributing this as a SPEC Survey but will provide responses to the Information Institute project team for analysis within its project, and ARL will *not* provide a separate SPEC Kit. Findings from this survey will inform the project team's ongoing study of outcomes in the context of libraries in research universities. More information about this project can be found on the Information Institute website <http://www.ii.fsu.edu/Projects/ARL/> or in the ARL New Measures Initiative website <http://www.arl.org/stats/newmeas/emetrics/>.

The purpose of this survey is to gain insights into the various factors affecting outcomes assessment in ARL member libraries within universities. (***Note:*** *If your library is not part of a university, we ask that you do not complete this survey as it does not apply to your organization.*) By "outcomes" we mean those *specific* outcomes of interest to libraries and their universities that flow from the mission- and goal-oriented work of those organizations, outcomes which give meaningful indications of whether the mission and goals are being achieved. The project team is interested in better understanding how universities and their libraries: (a) set their strategic directions with both institutional and library outcomes of interest; (b) articulate those outcomes and the results desired; (c) assess whether the desired outcomes have been achieved; and (d) use outcomes-related concerns and data in decision making.

Your participation will involve completing this survey and, if the information is readily available to you, it should take approximately 30-45 minutes to complete the open-ended questions (identifying and sending the requested documents may take longer). Your participation in this survey is voluntary and you may withdraw at any time. There is no penalty if you choose not to answer any or all of the questions. Your response to this survey will remain confidential to the extent allowable by law. The results of the study may be published, but any individual responses used will not be accompanied by identifying information. Documents collected, however, may be quoted and/or cited using the name of the originating university. The study team may contact willing survey participants for follow-up questions to gain more in-depth insights into their responses.

The study team asks that you complete this survey as soon as possible, and prior to July 6, 2001. Should you have any questions concerning the research project, please contact Bruce T. Fraser by telephone at (850) 645-3328, or by e-mail at bfraser@lis.fsu.edu.

Name of Institution:

Name of Respondent:

Title of Respondent:

Email:

Phone:

Open-Ended Questions

Please answer the following questions, in as much detail as possible, using the text boxes provided. Thank you for your time and effort.

1. **Institutional Outcomes:**
    a. What requirements do you receive from your university administration, accreditation board, faculty, legislature, and board of regents, etc., related to the key work of your library and how it should be assessed? Please specify in as much detail as possible.

b. What other directions, signals and cues are you receiving from (1) those listed above and (2) other stakeholder groups that influence your view of the key work of your library and how it should be assessed? For example, apart from formal requirements has your university administration communicated any themes (such as economic development in your state) that every campus unit is expected to support? Please specify in as much detail as possible.

2. **Library Operations/Processes:**
   How do the factors you listed in question 1a. and 1b. affect the planning, budgeting, acquisitions, and assessment of your library? Please specify in as much detail as possible.

3. **Outcomes Assessment**:
   a. How does the key work of your library impact the key work of the university? In other words, what does your library do that can be, or is, linked to the research, education, and service outcomes of your university? Please specify in as much detail as possible.

b. How do you know what impact your library has on your university and its mission? (Customer surveys, performance measurement, informal communications, intuition, etc.) Please specify in as much detail as possible.

c. How do you articulate this to the Provost or other university administrators and deans? Please specify in as much detail as possible.

Documents

In addition to the survey, please share any documents that will help us to understand how expectations are made clear to libraries by their stakeholders, how libraries are reacting, and how the interplay affects decisions—especially those related to budgeting—at the library and university levels. Two such documents are the university and library strategic plans. These important documents can contain information about what the library and university value and how they are situating themselves in the rapidly changing higher education landscape.

Other documents of interest include, but are not limited to, memos from the Provost (or other key university administrators) regarding the way budget decisions are made, library documents pertaining to outcomes assessment/performance measurement, and academic program review documents that mention library holdings/resources. We would like to thank those libraries that have already provided us with such documents in this project and encourage them to submit any additional items that may be useful.

To submit documents that can be found on the Web, please enter the URLs of the documents in the boxes provided. If certain documents are not available on the Web, but you will be submitting them, please check the space labeled "We will send this document via email, mail, or fax."

- Please email documents to:

Bruce T. Fraser
bfraser@lis.fsu.edu.

- Please fax documents to:

(850) 644-9763
Attn: Bruce T. Fraser

- Please mail documents to:

Bruce T. Fraser
Information Institute
226 Louis Shores Building
Florida State University
Tallahassee, FL 32306-2100

1. University strategic plan (or similar documents that pertain to vision, mission, goals, and/or indicators/measures)

467

Please identify URLs

____

____

____

____

___We will send this document via email, mail, or fax.

2. Library strategic plan (or similar documents that pertain to vision, mission, goals, and/or indicators/measures)

Please identify URLs

____

____

____

____

___We will send this document via email, mail, or fax.

3. Other documents from the Provost or others regarding strategic planning

Please identify URLs

____

____

____

____

___We will send this document via email, mail, or fax.

4. Other documents from the Provosts or others regarding budgeting

Please identify URLs

____

____

____

____

___We will send this document via email, mail, or fax.

5. Other university and/or library documents regarding outcomes, performance measurement, etc.

Please identify URLs

____

____

____

____

___We will send this document via email, mail, or fax.

Thank you for your time and effort and interest in this study. Please check the following box if you are willing to be contacted by a member of the project team for follow-up questions:

☐ I am willing to be contacted by a member of the project team for follow-up questions.

Appendix D: Content Analysis of the Survey by Question

In the question-by-question discussion of the survey responses that follow, we summarize in each case the general sense of the responses, highlighting selected examples that are either representative or otherwise noteworthy. Not all of the documents supplied spoke directly to each specific question, but often they did illustrate many of the points raised. When helpful, quotations without attribution (for the sake of confidentiality) from open-ended responses or documents are used below.

1a. What requirements do you receive from your university administration, accreditation board, faculty, legislature, and board of regents, etc., related to the key work of your library and how it should be assessed?

Most of the ARL libraries responded that there are few assessment requirements related to the library, if any, set forth by the university administration or others. Though requirements may not be set forth as a general rule, a variety of circumstances exist across the different campuses, and at a given campus at different times. Some respondents noted a freedom to assess the library with great discretion, and many indicated they provide annual accomplishment or budget reports to university administrators that list achievements for a given year. One stated that while having "no formal/legislated requirements regarding the key work of the library, the four year budget/strategic plan for the library, along with its consequent objectives and activities, *must be linked* … to the university's key strategic initiatives, [with] performance indicators" (emphasis added). Others mentioned performing self-studies and/or answering to review boards.

1b. What other directions, signals and cues are you receiving from (1) those listed above and (2) other stakeholder groups that influence your view of the key work of your library and how it should be assessed?

Two of the universities give specific directions, signal or cues. Others admit that there is a certain freedom because of their "modest formal structure," the fact that they are private universities, or because the "university lacks a strong statement of strategic objectives." One interesting observation was that one of the libraries looks at its interaction with other ARL members in order to determine what directions should be taken, as well as looking towards organizations like the Digital Library Federation. Feedback from students and faculty was also cited as a source of important signals. Three responded by pointing out they are land grant institutions and that this plays a significant role in determining what directions, signals and or cues are sent to the library. Two respondents mentioned interactions with the university president being important in this context.

2. How do the factors you listed in question 1a and 1b affect the planning, budgeting, acquisitions, and assessment of your library?

All of the respondents stated that in some way the requirements, directions, signals and the like have a direct effect on the planning, budgeting, acquisitions, and/or assessment of their libraries, though the relationship is not always clear or precise. One stated that the impact was only moderate. Another offered that: "They've made the library a more effective organization because it now must articulate clearly its goals and priorities and both assess itself and be assessed on how well those are met. In a new undertaking, an outgrowth of a campus committee, our AUL for Collections will meet with people designated by each collegiate dean to discuss, in detail, the College's priorities."

3a. How does the work of your library impact the key work of the university? In other words, what does your library do that can or is, linked to the research, education, and service outcomes of your university? Please specify in as much detail as possible.

More than half of the respondents indicated that this is either "unmeasured" or "unknown" because this process is "really hard to do in any quantitative way," as one pointed out. Another was "not convinced that this is really possible." However, many did offer a number of impacts, some matter-of-factly and others with explanations. In either case an academic library's role for its university's key work may vary depending on the institutional goals. The roles of university and research libraries are "geared to supporting the teaching, research, and service needs" of survey participants' universities. To illustrate, one library and its institution tries to anticipate the needs of faculty and students by providing "the most efficient way to access that information, including delivering materials to offices for faculty and to other libraries on grounds for students; providing electronic databases, and easy access to them, on or off-grounds; providing research and reference assistance through a variety of means; providing collections relevant to researcher's needs in several media; providing a variety of digital services; providing User Education courses and Short Courses in library and technology skills; providing free basic services to users from the local community." In other words, the role of the library is "to acquire relevant collections, to provide access to them, to provide the tools of technology to access them, and to provide instruction in their use."

The key work that the library does may influence the university's institutional outcomes of interest "by providing portals to information which results in the production of original research." One respondent noted that libraries "provide information resources for essential academic and research programs; instruct students in the identification, evaluation, and use of such resources; collaborate with faculty and serve as a research test bed for innovative information technology or information resource development projects; contribute staff time and expertise to participating in the university community; provide a valuable service on behalf of the university to the external community."

As some libraries reported, they have started several initiatives involving students and key faculty in developing or acquiring collections, in creating digital collections, and in designing services, thereby insuring that they will provide some definite support for at least some stakeholders' wants and needs. For example, the desired "emphasis can be on special collections, such as international collections, supporting international studies and many global initiatives."

3b. How do you know what impact your library has on your university and its mission? (Customer surveys, performance measurement, informal communications, intuition, etc.) Please specify in as much detail as possible.

There are various ways reported for what impact libraries have on their university institutions and their mission. Informal communications were reported to be one of the ways to become knowledgeable about what impact libraries have on their university missions. User surveys, both "broad-based and targeted", are widely used on campuses to know what impact libraries have impact on university communities, employing LIBQUAL+, ServQual and student surveys. In addition to informal communication, intuition, and feedback from faculty and administrators, universities use statistics about numbers of students reached through bibliographic instruction classes or information literacy programs, statistics about acquisitions growth (monographs, serials, electronic resources) by subject area, document numbers and subject breadth of collaborative projects with faculty and database and web use. Additionally, as one noted, the following techniques are used to find out what impact libraries have on campuses: Focus groups, usability testing, transaction logs, email monitoring (though this was not explained), grant and funding procurement, and citation studies.

3c. How do you articulate this to the provost or other university administrators and deans? Please specify in as much detail possible.

There are several ways of articulating the impact of the library to the provost or other senior university administrators. Respondents reported a number of activities that libraries do to articulate their needs and impacts to various university administrators, compiled as follows: Announcements and articles in university, annual reports, annual briefings, annual state of the library messages, budget request statements, committee discussions, during the deans' retreats, informal notes about specific events, newsletters, news releases, newspapers, personal conversations, presentations to various groups and individuals, including a "Board of Deans," statistical reports sent to university administrators, strategic planning process, survey reports, targeted communications (documents, letters, emails, phone calls, etc.), and the use of information in strategic documents.

These activities of course vary from one institution to another, and may in some cases be carried out either formally or informally. To identify the needs of library users, for example, one of the respondent institutions "uses results of surveys of incoming freshmen to demonstrate need for [a] cumulative instructional program." Almost all of respondents shared the importance of keeping the provost or other administrators and deans updated as well as informing "the chancellor and the executive Vice-chancellor, in University Council, and in our various advisory groups" regularly. As one respondent said, indicating sensitivity to possible indirect lines of communication, a library's "selected library advisory committees also report back to their deans (and the most effective communication is when deans hear these reports from their faculty rather than from the library)."

ARL E-Metrics Project
Fall 2001

Analysis of the Accreditation Standards of the Six Regional Higher Education Commissions for Senior Colleges and Universities

By

Bonnie Gratch-Lindauer
Coordinator of Library Instructional Services
Rosenberg Library and Learning Resources
City College of San Francisco
50 Phelan Ave.
San Francisco, CA 94112
<bgratch@ccf.org>

I. Introduction and Methodology

This report reflects the findings of content analyses of the standards and pertinent supplemental documentation of the six regional accrediting commissions of higher education that accredit senior colleges and universities. It addresses the following points:

- identification of overall trends in accreditation that affect libraries and information resources;
- a comparison, with examples of supporting text, of how outcomes are represented, contextualized, and operationalized with a particular, but not exclusive, focus on libraries;
- a description of how the standards and supplemental documentation reference electronic and networked services, particularly the need for university libraries to demonstrate the outcomes of these services and the need to show the connection between use of electronic and networked services and fulfillment of their missions;
- observations and suggested recommendations for university libraries based on this review and analysis.

Typically, the standards are part of a "Handbook of Accreditation" that contains a description of the process, the eligibility requirements, relevant policies that institutions must address in their self-study reports, and other documentation developed to assist institutions with preparing their self-studies and conducting evaluation and assessment studies. Only the Northwest Association integrates its policies within the standards by locating them at the end of the standard to which they relate. Some of the documents list "required" and/or "suggested" supporting documentation after each standard (WASC, Middle States, Northwest). All of them provide guidance for improving assessment and evaluation of institutional effectiveness and student learning either within the handbook or as separate policies.

The following documents were used in the content analysis:

1. *Handbook of Accreditation* (January 2001). Accrediting Commission for Senior Colleges and Universities. Western Association of Schools and Colleges (WASC). <http://www.wascweb.org>
   This includes the standards, policies, and procedures required by WASC.
2. *Characteristics of Excellence in Higher Education: Standards for Excellence in Higher Education* (1994). Commission on Higher Education. Middle States Association of Colleges and Schools (MS). <http://www.msache.org>
3. *Framework for Outcomes Assessment* (1996). Commission on Higher Education. Middle States Association of Colleges and Schools.
4. *Characteristics of Excellence in Higher Education* (February 22, 2001 Draft) and *Designs for Excellence: Handbook for Institutional Self-Study*, 7th ed. (2000). Middle States Association of Colleges and Schools. <http://www.msache.org>
5. *Standards of Accreditation* (1999). Commission on Colleges. The Northwest Association of Schools and Colleges (NW). <http://www.cocnasc.org>
6. *Criteria for Accreditation* (1998). Commission on Colleges. Southern Association of Colleges and Schools (SACS). <http://www.sacscoc.org>
7. *Principles of Accreditation* (March 2001 Draft). Commission on Colleges. Southern Association of Colleges and Schools. <http://www.sacscoc.org>
8. "Distance Education: Definition and Principles—A Policy Statement. (Adopted June 1997; Updated May 2000). Commission on Colleges. Southern Association of Colleges and Schools.
9. *Addendum to the Handbook of Accreditation*. 2nd ed. (March 2001). The Higher Learning Commission. North Central Association of Colleges and Schools. <http://www.ncahigherlearningcommission.org>
   This includes the text of the updated March 2001 "Criteria for Accreditation," current policies, and a document called "Assessment of Student Academic Achievement: Levels of Implementation" (updated March 2001).
10. *Standards for Accreditation* (1992). Commission on Institutions of Higher Education. New England Association of Schools and Colleges (NE). <http://www.neasc.org>
11. "Pilot Institutional Assessment Portfolios" (2001). Commission on Institutions of Higher Education. New England Association of Schools and Colleges. <http:// www.neasc.org>
12. "Statement of Commitment by the Regional Accrediting Associations for the Evaluation of Electronically Offered Degree and Certificate Programs" and "Best Practices for Electronically Offered Degree and Certificate Programs" (September 2000).
    The "Statement of Commitment..." was developed by the eight regional accrediting commissions and the "Best Practices..." are based on a document by the same title initially drafted by the Western Cooperative for Educational Telecommunications. Both are located in the North Central Association's *Handbook of Accreditation*, pp. 44-54.
    <http://www.ncahigherlearningcommission.org>

Both the current and proposed draft versions of the standards were reviewed and the status of the drafts and expected dates for final copy were confirmed with the regional accrediting associations. The Southern Association expects to have a near final draft on its Web site in August 2001 with final approval by December 2001. The Northwest and New England commissions are not currently working on revised standards. The Middle States Association expects to have a final and approved copy by early 2002. Throughout this report, the date of the standards will only be referenced in those cases where there is both a current and draft version of the standards.

This report primarily uses the text of the standards and pertinent supporting documentation such as policies and related documents. The process of accreditation usually involves several stages for institutions seeking accreditation and re-accreditation. Part of this process involves institutions documenting their compliance with basic eligibility requirements. All of the six commissions' documents reviewed—except the New England Association—contain eligibility requirements. These basic requirements, along with text from the standards relating to libraries and electronic resources and services, are included in Figure 2 in the Appendix. Eligibility requirements relating to libraries and networked information sources are typically vague and input-specific. Therefore, it is particularly noteworthy that the WASC requirement specifies having programs for student training and instruction in information literacy and that institutions "must also be able to demonstrate that library use is a fundamental part of curricula."

II. Overall Trends Related to Libraries and Information Resources Based on Contextual Elements and the Overall Organization and Conceptualization of the Standards

1. Mission and goals-driven

All of the documents emphasize a goals-based assessment model using mission-driven standards to define educational quality. They all explicitly express the expectation that each program or unit establishes goals which derive from and support the purpose of the institution; evaluates its success in achieving these goals; and demonstrates the use of the evaluation findings in making improvements and modifications. Clearly, the university library is included in this expectation.

2. Text is less prescriptive and specific

Overall, the language used in the documents revised since 1998 and in those currently undergoing revision is less prescriptive and less concerned with as many specific inputs. SACS has eliminated the "must" in its standards. Figure 2 in the Appendix compares the text that references libraries, information resources, and information technology and provides examples of the de-emphasis on the amount of and specificity of the text relating to library services and resources. Three of the six commissions (WASC, Middle States, and SACS) have eliminated a separate standard for libraries and information resources; instead statements referencing them are embedded in other sections of the standards.* In these documents references to libraries and information resources are less specific than the previous editions of their standards. Comparing the text in Figure 2 for MS and SACS, for example, confirms that there is less text devoted to libraries and information resources and services than in the 2001 drafts. It is also much less specific, describing primarily three expectations in the 2001 drafts: having adequate staff; providing access to appropriate collections, resources and services; and ensuring that students receive instruction in the use of library resources and information technology.

Only two commissions (New England and Northwest) have maintained a separate standard with six or so separate statements about collections, services, facilities, staffing, access, and organization and operations. Moreover, now all of the revised or draft standards are either somewhat vague about collection ownership or explicitly state that access to adequate library collections and resources is sufficient.

3. More experimental and collaborative accreditation process

The overall accreditation process also shows changes among the recently revised and draft documents. WASC, Middle States, and North Central have adopted revised accreditation models that are more focused on innovation, experimentation, and collaboration. These values are reflected in the following statement from the WASC *Handbook of Accreditation*: "to support multiple models of institutional presentation and demonstration of meeting common core commitments and standards" and "focus on collaboration between WASC and institutions for developing new approaches."

---

* North Central did not have a separate standard referencing libraries in the former edition of its standards either.

The conceptualization and phrasing of the revised standards in the WASC *Handbook of Accreditation* are unique among the six documents reviewed for reflecting a process model that promotes desired outcomes and emphasizes the dynamic nature of institutional improvement:

Standard 1 "Defining Institutional Purposes and Ensuring Educational Objectives"
Standard 2 "Achieving Educational Objectives through Core Functions"
Standard 3 "Developing and Applying Resources and Organizational Structures to Ensure Sustainability"
Standard 4 "Creating an Organization Committed to Learning and Improvement"

North Central's March 2001 *Addendum to the Handbook of Accreditation* describes its commitment to promoting flexibility and innovation, as well as providing new services that share effective models of learning and provide "new ways to work in partnership with stakeholders from higher education and the public to foster a culture of assessment for its members." It has also launched an alternative process for re-accreditation called the Academic Quality Improvement Project. The goal of AQIP is to "design an innovative, more challenging alternative to current re-accreditation, one that engages institutions by increasing the tangible benefits it delivers to them and based on quality improvement principles and values." The criteria, questions, and information about this initiative are located at the Web site <http://www.AQIP.org>.

The eight regional accrediting commissions have drafted a "Statement of Commitment for the Evaluation of Electronically Offered Degree and Certificate Programs." The section "Commitment to Cooperation, Consistency and Collaboration" contains the following statement: "As each of the regional commissions continues to accrue skills in assessing distributed education programming, they are pledged to learn from the experiences of one another, particularly when innovative approaches are utilized."

4. Emphasis on outcomes

The emphasis on assessing student learning and other outcomes is generally stronger in those standards that have been revised since 1998 or are currently undergoing revision. Moreover, Title IV of the 1998 Higher Education Amendments requires universities that receive federal monies to have an outcomes assessment plan that includes "a review of the institution's success with respect to student achievement in relation to mission. Institutions should include in the self-study a review of course completion, graduation rates, state licensure exam pass rates, and other data as appropriate to the mission of the institution and the programs it offers." (*Design for Excellence: Handbook of Institutional Self-Study*, Middle States, p.32)

The term "outcomes" is used extensively in the 2001 Middle States draft standards and those of the Northwest Association. The following examples illustrate this emphasis.

- Northwest (1999) has added the concept of evaluating effectiveness to two of its standards: "Standard 1. Institutional Mission and Goals, Planning and Effectiveness" and "Standard 2. Educational Program and Its Effectiveness." It also has a "Policy on Educational Assessment" that is quite specific with examples of outcomes measures which, "when used in appropriate combinations and informed by the institutional mission, could yield an efficacious program of outcomes assessment." The explanation for the intent of this policy confirms its commitment to outcomes assessment:

> "The intent of Commission policy is to stress outcomes assessment as an essential part of the ongoing institutional self-study and accreditation processes, to underline the necessity for each institution to formulate a plan which provides for a series of outcomes measures that are internally consistent and in accord with its mission and structure, and finally, to provide some examples of a variety of successful plans for assessing educational outcomes." (2.2. "Policy on Educational Assessment," 1992)

- Middle States (February 2001 draft) describes the principles that guided the development of the proposed new standards, "these standards consistently emphasize student learning and student learning outcomes…." In the standards an emphasis on student learning is paired with less emphasis on specific resources. "The increased emphasis on information literacy expands and clarifies the role of learning materials and library professionals, who will continue, with faculty and others, to develop this important skill." (p. 2)
- WASC established this principle as part of its redesign work for the January 2001 revised Standards: "Principle 3: Greater emphasis is needed on evidence of educational effectiveness and student learning." (p. 3) It also promoted educational effectiveness as a "core commitment." The new WASC review process model relies on portfolios that can be updated for subsequent reviews, attempting to move to a "best practice" model. Much of what might go into a portfolio would be performance-based, looking at outcomes of student learning and how planning and institutional resources have been used to advance the mission and goals.
- North Central (March 2001) has revised substantially "Chapter Reference A. Assessment of Student Academic Achievement: Levels of Implementation" in its *Handbook of Accreditation* providing an "important new tool to assist institutions in understanding and strengthening their programs for assessment of student academic achievement…." The three "Levels of Implementation" contain characteristics associated with a particular level at any given time. These levels are intended to provide markers of the progress institutions have made in developing their assessment programs. Certainly, these levels of assessment apply to university library information literacy programs.
- Even the New England Commission, whose 1992 standards have not yet been revised, initiated in fall 2001 an experiment in strengthening assessment of student learning outcomes and institutional effectiveness. This project will invite institutions to create assessment portfolios which will be composed of the following parts: vision for assessment; fact book of indicators of "input, process, and outcome variables with particular emphasis on those relating to teaching and learning (e.g., student use of library per semester);" presentations of selected assessment efforts, such as course, program, and institution level assessment studies; scholarly reflections from faculty and administrators about their efforts to conduct assessment and their findings; and peer and external review.

5. Information literacy emphasized

As a specific student learning outcome, information literacy has been promoted in all but two (SACS and North Central) of the standards that have been revised since 1998. Moreover, more text exists about the shared role of the library and teaching faculty relating to information literacy instruction in the section of the standards covering the educational program. In fact, for the first time there are three standards documents (WASC, Middle States, and Northwest) that include information literacy as a general educational requirement. (In Northwest's document, the phrasing varies but implies information literacy: "literacy in the discourse or technology appropriate to the program of study," Standard 2C. Undergraduate Program.)

The document developed and endorsed by all eight of the regional accrediting commissions, "Best Practices for Electronically Offered Degree and Certificate Programs," also includes a statement in the "Student Support" section that says, "4 c. The institution recognizes that appropriate services must be available for students of electronically offered programs.... With variations for specific situations and programs, these services may include...training in information literacy, including research techniques...."

6. Few specific references to electronic and networked resources and services
There is very little specific text in the standards and supporting documents referencing electronic and/or networked resources and services. There are only five instances of "network" or "electronic resources and services," or equivalent terms like "electronic bibliographic databases" or "online catalogs." Here are the extracts identified:

Northwest: 5.A. Purpose and Scope. Three statements defining the components of information resources and services "(e.g., networks, telecommunication facilities, computer centers, libraries, media center); and the info. resources/services supporting the educational programs."

SACS (1998): 5.1.2. Services. "Convenient, effective access to electronic bibliographic databases, whether on-site or remote, must be provided when necessary to support the academic programs."

SACS (1998): 5.1.3. Information Technology Resources and Systems. "A reliable data network should be available so that students, faculty, and staff may become accustomed to electronic communication and familiar with accessing national and global information resources."

North Central: Criterion 2. Human, Financial, and Physical Resources. "j. Academic resources and equipment (e.g., libraries, electronic services and products, learning resource centers...) are adequate to support the institution's purposes."

"Best Practices for Electronically Offered Degree and Certificate Programs." 4. Student Support. 4.c. "The institution recognizes that appropriate services must be available for students of electronically offered programs.... With variations for specific situations, these services may include: ...remote access to data bases, online journals and full-text resources, document delivery services...."

However, there are many references to the phrase "information resources and services," "information technology resources and services" or "information technologies." I suggest that these broader phrases are intended to include electronic and networked resources and services. This lack of explicit references that use the precise phrase "electronic and networked resources and services" doesn't mean that the accrediting commissions don't expect libraries to demonstrate how these resources and services support student learning and faculty research. While there may not be a need to demonstrate the outcomes of electronic and networked resources and services, there is a need to provide evidence that documents the connections between their use and fulfillment of the institution's goals. What follows are but four examples that illustrate this connection:

Northwest: Standard 2. Educational Program. 2.A.8. "Faculty, in partnership with library and information resources personnel, ensure that the use of library and information resources is integrated into the learning process."

New England: Standard 7. Library and Information Resources. 7.1. "...The institution ensures that students use these resources as an integral part of their education."

WASC: Standard 2. Achieving Educational Objectives through Core Functions, subsection Teaching and Learning. Criterion 2.3. "The institution's expectations for learning and student attainment are clearly reflected in its academic program and policies. These include the organization and content of the curricula...and the use of its library and information resources."

WASC: Eligibility Requirements #17. "…The institution must also be able to demonstrate that library use is a fundamental part of curricula."

Throughout this report, then, the phrase "information resources and services" is understood to include electronic and networked resources and services.

III. Comparison of accreditation standards' treatment of outcomes

Figure 1 provides text from the standards and appropriate supporting documentation related to outcomes and impacts that reference or imply the contributions of university libraries. Text that uses equivalent terms like "competencies" and phrases such as "achievement of educational goals and/or learning objectives," "evaluation of student performance," and "evidence of educational effectiveness and student learning" is included. These phrases imply outcomes that are either explicitly or less directly connected to the contributions of university libraries.

Statements were selected that show how outcomes are articulated and conceptualized with a particular, but not exclusive, focus on libraries and electronic and networked services. The context of these excerpts is identified by the name and/or section of the standard. In cases where the connections are less obvious or direct, parenthetical comments suggest how the statement might apply to university libraries. Some of the less direct items are included because the text refers to "all programs or units." In a few cases, the statement may not refer strictly to outcomes, but rather to the impact or effects of library and information resources and services. The following observations can be drawn from the extracts.

1. The majority of these outcomes and outcomes-related statements that refer to libraries and information resources are located in sections of the standards that deal with the education program and institutional effectiveness.

2. The use of library and information resources is connected to student learning outcomes in four of the documents, and evidence such as inclusion in course syllabi and integration of library use into the undergraduate curriculum are offered as measurable indicators for assessment purposes in two of the documents.

3. The university library's role in helping students develop information literacy skills is an important student learning outcome referenced in four of the documents and in the "Best Practices for Electronically Offered Degree and Certificate Programs" endorsed by the accrediting commissions.

4. Assessing student needs, perceptions, and levels of satisfaction with educational support services (i.e., library and information services) and demonstrating that the findings from these user studies are used for program improvement is a fundamental expectation of all the regional accrediting commissions.

5. Appraisal of annual institutional goals and progress in their accomplishment are suggested as a type of evidence contributing to institutional outcomes, or in some of the documents the phrase used is "institutional effectiveness."

6. All of the standards describe the need for institutions to have an assessment or evaluation plan and to document that the findings are utilized for program improvement. Some of the documents clarify this requirement to mean that each program or unit should have an assessment plan.

7. Several of the documents refer to the campus climate or the institutional environment that supports teaching and learning. Three specifically connect library and information resources and services to the quality of the learning environment. The implication is that university libraries should clearly describe the resources and services they provide that directly support the learning environment, how these are used, and with what effects on students and faculty.

Figure 1. Text Related to Outcomes and Impacts Directly and Indirectly Involving Libraries and Information Resources and Services

---

Western Association of Schools and Colleges (January 2001)

Standard 2. Achieving Educational Objectives through Core Functions. subsection "Teaching and Learning."

Criterion 2.2 Baccalaureate programs engage students in an integrated course of study....These programs also ensure the development of core learning abilities and competencies including, but not limited to, college-level written and oral communication, quantitative skills, information literacy....

2.2 Guideline. Competencies required for graduation are reflected in course syllabi for both general education and the major.

Criterion 2.3. The institution's expectations for learning and student attainment are clearly reflected in its academic program and policies. These include the organization and content of the curricula...and the use of its library and information resources.

2.3 Guideline. The use of information and learning resources beyond textbooks is evidenced in syllabi throughout the undergraduate and graduate curriculum.

Criterion 2.7. In order to improve program currency and effectiveness, all programs offered by the institution are subject to review, including analyses of the achievement of the program's learning objectives and outcomes. (A university library's information literacy program clearly applies. To the extent that libraries connect their educational programming to the curriculum, it is also possible to consider under this criterion a university library's exhibits program, lecture/film series, or other similar programming that is directly linked to the curriculum.)

(The following are relevant "Questions for Institutional Engagement" provided in the WASC document to generate measures and qualitative documentation to demonstrate how the library directly contributes to these three criteria.)

Questions for Institutional Engagement 3. To what extent does the institution provide an environment that is actively conducive to study and learning, where library, information resources, and co-curricular programs actively support student learning?

Questions for Institutional Engagement 8. To what extent does the institution ensure that students develop expected core learning abilities and competencies before they graduate? (Applies to information literacy)

Standard 2. subsection "Support for Student Learning."

(Even though the library is not named here, as a major instructional and instructional support program, an expectation for its involvement and its impact is implied.)

Criterion 2.10. Regardless of mode of program delivery, the institution regularly identifies the characteristics of its students and assesses their needs, experiences, and levels of satisfaction. The information is used to help shape a learning-centered environment and to actively promote student success.

Question for Institutional Engagement 6. In what ways does the institution gather, analyze and use information about the needs and preferences of students and the values they place on programs and services? Is this information effectively used to create a climate conducive to student and institutional learning?

Southern Association of Colleges and Schools (1998)

Section V. Educational Support Services.

It is expected that each program or unit will establish goals which derive from and support the purposes of the institution, evaluate its success in achieving these goals and demonstrate the use of the evaluation in making appropriate modifications in resources, programs and services.

Distance Education: Definition And Principles: Policy Statement. subsection "Library and Learning Resources." (1997, updated May 2000)

The institution ensures that students have access to and can effectively use appropriate library resources. The institution monitors whether students make appropriate use of learning resources.

Section III. Institutional Mission, Governance and Effectiveness. subsection "Institutional Effectiveness." (March 2001 Draft)

14. The institution identifies expected outcomes for its educational programs and its administrative and educational support services; assesses whether it achieves these outcomes and provides evidence of improvement based on analysis of those results.

Section IV. Programs. subsection "Educational Programs."

1. The institution demonstrates that each educational program for which academic credit is awarded...has stated program and learning outcomes and ensures appropriate levels of student achievement. (Applies to information literacy credit courses and/or information literacy components within other courses.)
14. The institution's use of technology enhances student learning, is appropriate for meeting the objectives of its programs, and ensures that students have access to and training in the use of technology. (Indirect but can apply to electronic and networked resources and services.)

Northwest Association of Schools and Colleges (1999)

Standard 1.B. Planning and Effectiveness. Required Supporting Documentation.

Evidence that demonstrates the analysis and appraisal of institutional outcomes; such as: annual goals and assessment of success in their accomplishments; studies regarding effectiveness of programs and their graduates; test comparisons that reveal beginning and ending competencies; satisfaction surveys of students, alumni and employees. (University libraries would be included and could use as evidence annual goals and assessment of success in their accomplishments and satisfaction surveys.)

Standard 2. Educational Program. 2.A.3.

Degree and certificate programs demonstrate a coherent design...synthesis of learning, and the assessment of learning outcomes; and require the use of library and other information resources.

Standard 2.B.2.

The institution identifies and publishes the expected learning outcomes for each of its degree and certificate programs. Through regular and systematic assessment it demonstrates that students who complete their programs, no matter where or how offered, have achieved these outcomes. (Programs that have integrated information literacy skills are implied.)

Standard 2.C. Undergraduate Program.

Baccalaureate...programs include a substantial core of general education instruction with identifiable outcomes and require competence in a. written and oral communication; b. quantitative reasoning, c. critical analysis and logical thinking, and d. literacy in the discourse or technology appropriate to the program of study. (Implied is the effective use of electronic and networked resources.)

2.2. Policy on Educational Assessment.

The Commission expects each institution and program to adopt an assessment plan responsive to its mission and its need.... The Commission urges the necessity of a continuing process of academic planning, the carrying out of those plans, the assessment of the outcomes, and the influencing of the planning process by the assessment activities. (Applies to university libraries.)

2.6. Policy on Distance Delivery of Courses, Certificate, and Degree Programs.

2. The institution evaluates the educational effectiveness of its distance education programs (including assessments of student learning outcomes, student retention, and student satisfaction. (Implied is that student satisfaction with library and electronic resources and services would be included in student surveys.)

Required Supporting Documentation for Standard 2.

2. Inventory of documents that demonstrate the appraisal of educational program outcomes. Examples may include: annual goals and assessment of success in their accomplishment; test comparisons that reveal beginning and ending competencies; surveys of student satisfaction.

Standard 3. Students. Supporting Documentation. Required Exhibits.

7. Evidence of the impact of student services on students. (Clearly the university library could connect use and user satisfaction measures from some of its services, such as those specifically listed in the "Supporting Documentation for Standard 5" below.)

Standard 4. Faculty. Required Supporting Documentation for Standard 4.

Representative examples of the institutional and public impact of faculty scholarship.... (This could apply to librarian-scholars as well as university library direct support to faculty scholarship and research.)

Standard 5.E. Library and Information Resources. Planning, and Evaluation.

Library and information resources planning activities support teaching and learning functions by facilitating the research and scholarship of students and faculty. Related evaluation processes regularly assess the quality, accessibility and use of libraries and other information resource repositories and their services to determine the level of effectiveness in support of the educational program.

5.E.3. The institution regularly and systematically evaluates the quality, adequacy and utilization of its library and information resources and services....

Supporting Documentation for Standard 5.

Fourteen "required exhibits" including: policies, student and faculty orientation materials, use statistics, collection statistics, assessment measures to determine the adequacy of holdings and services to support the educational programs both on and off campus, computer usage statistics related to retrieval of library resources, comprehensive budgets for library and information resources.

New England Association of Schools and Colleges (1992)

(Perhaps because this association's standards date to 1992, none of the standards refer to outcomes or use equivalent language. However, a pilot institutional assessment project is underway "to encourage its member institutions to strengthen the assessment of student learning and institutional effectiveness." The pilot will select 10 institutions for fall 2001 and continue for two years. The project involves the use of institutional assessment portfolios that are to include the following components.)

1. vision for assessment–a description of the institution's vision for assessment...of expectations and available resources in relation to the assessment of student learning outcomes and institutional effectiveness.

2. fact book indicators–input, process, and outcomes variables with particular emphasis on those related to teaching and learning...(e.g., students involved with faculty in research,...student use of library per semester, and hours of study per week.
3. presentations of selected assessment efforts–a selection of what the institution regards as some of the most recent and useful course, program, and institution-level assessment efforts would be presented. Another example might be a description of the implementation and findings regarding student outcomes from a capstone course designed to understand to what degree students have developed the desired competencies expected within a given program.
4. scholarly reflections from faculty and administrators–selected faculty and administrative leaders would present scholarly reflections of their efforts to conduct assessment and inquiry....
5. peer and external review–the portfolio would present reviews by peers regarding their sense of what the institution is accomplishing with its assessment efforts....

(This pilot can provide participating university libraries opportunities to help identify which measures and other documentation will be used to show evidence of their contributions and impact on student learning and other institutional goals.)

North Central Association of Colleges and Schools (March 2001)

(While there are no explicit references to outcomes and libraries, one standard contains text that implies library contributions.)

Standard 3.

The institution is accomplishing its educational and other purposes....The Commission considers evidence such as:
b. assessment of appropriate student academic achievement in all its programs, documenting proficiency in skills and competencies essential for all college-educated adults.
c. graduate programs that expect students and faculty to value and engage in research, scholarship and creative activity.

(The effects of information literacy programs and librarian-departmental teaching faculty collaborations can be implied in the two types of "evidence" described in 3b. and 3c.)

(North Central has a very detailed document, "Chapter Reference A. Assessment of Student Academic Achievement: Levels of Implementation" (updated March 1, 2001) in its *Handbook of Accreditation.* The "Levels of Implementation" are intended "to assist institutions in understanding and strengthening their programs for assessment of student academic achievement...." This document contains three levels from level 1 "beginning implementation of assessment programs" to level 3 "maturing stages of continuous improvement." The clusters of characteristics contained in these levels serve as indicators of progress on a continuum of assessment. None of the statements in this document refer specifically to libraries and information resources, but implied is the library's role in teaching information literacy as a competency "essential for all college-educated adults."

North Central's redesign of its accreditation process has resulted in "the Commission's new alternative process for maintaining accreditation, the Academic Quality Improvement Project" <http://www.AQIP.org/criteria.html>. It appears very useful for outcomes assessment, as each major criterion has recommended questions to provoke measures of effectiveness and outcomes.)

Middle States Association of Colleges and Schools (1994)

(The standard Institutional Effectiveness and Outcomes contains about one page of text. Following are pertinent statements.)

Institutional Effectiveness and Outcomes.

Outcomes assessment involves gathering and evaluating both quantitative and qualitative data which demonstrate congruence between the institution's mission, goals, and objectives and the actual outcomes of its educational programs and activities. The ultimate goal of outcomes assessment is the improvement of teaching and learning. The approaches may vary and need not be elaborate or dependent on quantitative criteria, but they should be systematic and thorough.... An institution should be able to demonstrate that the information obtained is used as a basis for ongoing self-renewal. In addition to assessing academic achievement, institutions should seek ways to assess the degree to which students' attitudes, social and ethical values, interests, and commitment to scholarship and lifelong learning develop as a result of their education....Especially significant are institutional studies which provide insights into effective teaching and the role of campus climate in promoting student learning and development." (University libraries' impact on campus climate is implied.)

Standard: Library and Learning Resources.

Paragraph #7: Librarians, information specialists, and other staff must demonstrate their professional competence on the basis of criteria comparable to those for other faculty and staff. They should also help facilitate the teaching and learning process, especially in assisting students to improve their information skills....

Paragraph # 9: A system for assessing the effectiveness of library and learning resource should be available. It should focus on utilization, accessibility, availability and delivery of materials.

Framework for Outcomes Assessment. (1996)

(This separate document, presents guidance for institutions preparing to meet the outcomes assessment requirements as delineated in the standards Principles, process and methods are discussed. Selected statements follow.)

Student cognitive development should be one of several components. Other measures might include student evaluations of instructional quality, measures of student satisfaction with the quality of support services....(p. 14)

The analysis of student achievement with respect to general education utilizes different measurement objectives of assessing competencies in 4 broad areas: cognitive abilities...competence in information management skills and communication....(p. 18)

Learning Environments–Assessments of program majors typically extend beyond examining learning outcomes to include, as additional indicators of program quality, various aspects of the educational environment which are related to or affect student learning in the major....Examples of such measures, listed in Figure 4, relate to program inputs and processes. While they offer no direct information on the extent and quality of student learning, they can provide indirect information on educational quality when their relationship to the breadth and depth of student learning has been determined. (p. 21)

(Figure 4 shows "student use of learning resources" as a process measure and "library holdings" as an input measure. The implication expressed here is that specific library and electronic resources usage measures, in conjunction with descriptive information about collections and access to resources, are important "indirect information" about the quality of the learning environment.)

Middle States Association of Colleges and Schools (February 2001 Draft)

Standard 1. Mission, Goals and Objectives.

Objectives are outcomes-based and measurable, and thus they provide mechanisms for on-going review and refinement of goals.

Standard 4. Institutional Resources.

The effective and efficient use of the institution's resources is analyzed as part of ongoing outcomes assessment. (In the "Context" narrative it is made clear that this standard includes "technology, research, and instructional support resources.")

Supplemental Analysis and Documentation.

...although not required, the following may facilitate the institution's own analysis relative to this accreditation standard: evidence of cooperative agreements for inter-institutional collaboration and resource sharing, analyses of any resulting efficiencies, and impact on student achievement of academic goals.

Standard 10. Educational Program.

The institution's education programs display academic content, rigor and coherence.... The institution identifies student learning outcomes, including knowledge, skills and values for each program.

(Within the "Context" section for Standard 10 is found this statement about information literacy: "Information literacy...is vital to all disciplines and to effective teaching and learning in any institution...Academic quality, student learning, teaching performance, and institution effectiveness are enhanced by programs that assist students, faculty and instructional staff to use information resources in a variety of media and formats.")

"Fundamental Elemental of Educational Program."

Learning resources, library services, and professional library staff support adequate to support the institution's educational programs; collaboration between professional library staff and faculty in teaching and fostering information literacy skills relevant to the curriculum and to faculty research; programs that promote student use of information and learning resources.

Supplemental Analysis and Documentation.

...evidence of course syllabi, incorporating learning outcomes; review of results from the institution's implemented outcomes assessment plan; assessment of information literacy outcomes;...evidence of information literacy incorporated in the curriculum with syllabi....

(The following types of evidence, while not outcomes, are included in this section.)

...evidence of local and remote information resources, access structures, and technologies for experimentation adequate to support the curriculum; evidence of accessible reference tools to ascertain where relevant materials exist and are located; evidence of trained instructional and reference staff or other support services, available on-site or via remote access, to help students and teaching staff locate and evaluate information tools and resources; evidence of an adequate policy and process for the development and management of information resources tailored to the mission and goals of the institution.

(It is implied that these types of input measures can provide partial evidence of a quality learning environment.)

Standard 11. General Education. "Fundamental Elements of General Education."

Relative to this standard, an accredited institution is characterized by: general education requirements that assure that upon degree program completion, students are proficient in oral, written and performance communication; scientific and quantitative reasoning, technological competency, and information literacy which includes critical analysis and reasoning; assessment of general education outcomes within the institution's overall plan for assessing student learning.

Standard 13. Institutional Assessment.

The institution has developed and implemented an assessment plan... and its effectiveness in assuring that its students and graduates achieve the appropriate learning and other outcomes.... While the Commission expects institutions to engage in outcomes assessment, it does not prescribe a specific approach or methodology....Nevertheless, an institution engaged in self-study or periodic review should provide evidence that the assessment of outcomes, particularly learning outcomes, is an ongoing institutional activity.

"Fundamental Elements of Institutional Assessment."

...a written assessment plan and process that meets the following criteria: ...assesses periodically the achievement of institutional goals that include the total range of curricula, activities, and support services;...systematic and thorough use of multiple qualitative and quantitative measures, which maximize the use of existing data and information....

Standard 14. Assessment of Student Learning.

Although related to overall institutional effectiveness, the assessment of student learning outcomes has the student as its primary focus of inquiry.... Outcomes assessment is essential regardless of the nature of the institution, its particular mission, the types of programs it offers, or the manner in which its educational programs are delivered and student learning facilitated.

"Fundamental Elements of Assessment of Student Learning."

...learning objectives for individual courses and for all programs;...an implemented plan for assessing all educational programs, including basic skills programs, regardless of where or how delivered, that includes multiple measures of student learning, at least some of which directly address learning outcomes.

Supplemental Analysis and Documentation.

Evidence of assessment plans that include multiple types of outcomes, such as cumulative learning, analytical and information skills....

Best Practices for Electronically Offered Degree and Certificate Programs. (2001)

developed and endorsed by the eight regional accrediting commissions

(The following selected statements are considered essential to quality distance education programming.)

Curriculum and Instruction section.

Methods change but standards of quality endure. The important issues are not technical but curriculum-driven and pedagogical. Decisions about such matters are made by qualified professionals and focus on learning outcomes for an increasingly diverse student population.

Question for Review.

Does the program design involve the demonstration of such skills as analysis, comprehension, communication, and effective research?

Evaluation and Assessment section.

5d. Overall program effectiveness is determined by such measures as...student satisfaction as measured by regular surveys...the extent to which access is provided to students not previously served...measures of the extent to which library and learning resources are used appropriately by the program's students...usage records concerning use of the library and learning resources and instructor assignments that require such usage.

IV. Concluding Observations and Recommendations

Based on the content analyses, especially the text in Figures 1 and 2, the following observations and recommendations are made:

1. The university library, in collaboration with faculty, plays a major role as an academic program in teaching information literacy skills. Probably the most direct contribution the library makes to institutional goals is its role in developing clear student learning outcomes for information literacy skills; assessing the progress and achievement of these outcomes; and showing how the findings are used to improve student learning. For those institutions where information literacy credit courses, or components of credit courses, are offered and where information literacy skills are part of general education requirements, this contribution is even stronger.

2. The university library is also an important academic support unit and as such provides measurable information services and resources that contribute to student learning. This observation is buttressed by the fact that more of the regional standards have included references to the use of libraries and information resources and services in the "Educational Program" section of the standards, thus connecting it directly to teaching and learning standards. In fact, four of the six either require use of library and information resources or use language like "use of library and information resources is fundamental." These contributions are articulated or implied in several ways:

   a. by suggesting that course syllabi or course learning outcomes be used as sources of data to document usage of library and information resources;
   b. by providing services, exhibits, and programming that directly contributes to physical and virtual campus environments that are conducive to learning and study;
   c. by offering specific services and resources to graduate programs and distance education programs. University libraries have an opportunity to present various quantitative and qualitative measures that demonstrate how the library supports graduate programs and distance-learning courses and degree programs. While a university library's support may not be that different than how it supports on-campus learners, the clustering and presentation of multiple measures that directly support distance learners are evidence of the library's instructional support role to a potentially important and growing segment of the university;
   d. by providing resources and services to support faculty research, scholarship, and professional development; and
   e. by collaborating with other information technology providers to plan for and evaluate the adequacy and access to information resources and services provided online.

3. University libraries need to make more explicit and public the connections between the following:

   a. how their resources and services support institutional goals. In some of the standards, appraisal of annual institutional goals and progress in their accomplishment is suggested as a type of evidence contributing to institutional effectiveness;
   b. how their resources and services are used, by whom, and the effects or impacts of this use; and
   c. how their strategic plans and assessment plans support the institution's planning documents and assessment process and how the findings of the library's assessment activities contribute to the achievement of the institution's mission and goals.

4. Perhaps university libraries should reserve the term "outcomes" for those measures and supporting documentation that provide evidence of student performance and proficiency related to information

literacy skills, while using the term "impacts" or "effects" to document their other contributions to institutional goals. This suggestion is based on the text of several of the standards which refer to the library's contributions to institutional or educational effectiveness. There is little specific guidance or requirements about how to demonstrate the library's contributions to institutional effectiveness in the standards that were reviewed. However, a main point made in all the standards is that each program and unit of the institution is to evaluate its contributions and effectiveness against the goals it sets for itself. Of course, these goals are directly linked to the university mission and goals. University libraries could strengthen their evidence by triangulating data and supporting information. They could group such measures as selective qualitative descriptions of resources and services with usage data for specific services and with user satisfaction and perceptions of benefit data findings. All of this could be grouped to show the impact of library and information resources and services on the contributions listed above in #2. a.–e. Wherever possible, this type of clustering could be organized by academic programs or schools.

APPENDIX

Figure 2. Comparison of Documents with and without a Separate Standard Relating to Libraries and Information Resources

Below is a comparison of documents that currently have a separate standard for libraries and information resources with those that do not. The first four entries (New England, Northwest, Southern 1998, and Middle States 1994) compare the text of standards and other relevant documents that have a separate standard for libraries and information resources. The last four entries (North Central, Southern 2001, WASC, and Middle States 2001), below the double line, compare the text of standards and other relevant documents for those accrediting commissions that lack a separate standard for libraries in their current standards or in the proposed revisions.

Regional Commission	*Components and Summary of Content for Separate Standard(s) Relating to Libraries*
New England (1992)	**Standard 7. Library and Information Resources** Six paragraphs summarized below. 7.1 Covers availability of suitable resources to support instruction. "The institution ensures that students use these resources as an integral part of their education." 7.2 Deals with ownership or guaranteed access of collections and services and provision of facilities adequate to house collections. "Through the institution's ownership or guaranteed access, sufficient collections and services are readily accessible to students wherever programs are located or however delivered." 7.3 Describes the financial support necessary to maintain and improve library and information resources. 7.4 Covers the type of staffing and the provision of appropriate orientation and training for use of these resources. 7.4 Covers the type of staffing and the provision of appropriate orientation and training for use of these resources. 7.6 Deals with evaluation of its library and information resources. "The institution regularly and systematically evaluates the adequacy and utilization of its library and information resources, and uses the results of the data to improve and increase the effectiveness of these services."
Northwest (1999)	**Eligibility Criteria** 16…has at least a core library and learning resources appropriate to its mission, and it provides access to specialized library and learning resources needed for independent work in the fields and at the levels represented by its offerings. **Standard 5. Library and Information Resources** 5.A Purpose and Scope. Three statements defining the components of information resources and services (e.g., networks, telecommunication facilities, computer centers, programs.) 5.B Information Resources and Services. Five statements relating to equipment and the acquisition and organization of materials; the role of library and information resources/services contributing to "developing the ability of students, faculty, and staff to

use the resources independently and effectively;" policies and procedures for the management of information resources; involvement of faculty and students in the planning and development of library resources and services; and "5.B.5. computing and communications services are used to extend the boundaries in obtaining information and data from other sources including regional, national and international networks."

5.C. Facilities and Access. Two statements describing the need for adequate facilities, collections and access. "5.C.2. In cases of cooperative relationships...formal documented agreements are established. These cooperative relationships and externally provided information sources complement rather than substitute for the institution's own adequate and accessible core collection and services."

5.D. Personnel and Management. Six statements about staffing, professional development, and provision of "sufficient financial support for library and information resources and services." "5.D.4. Organizational arrangements recognize the need for service linkage among complementary resource bases (e.g., libraries, computing facilities, instructional media, and telecommunication centers)."

5.E. Planning and Evaluation. Three statements describing the need for a planning process that involves all constituent groups and "5.E.3. The institution regularly and systematically evaluates the quality, adequacy, and utilization of its library and information resources and services, including those provided through cooperative arrangements, and at all locations where courses or degrees are offered...."

Supporting Documentation for Standard 5

Fourteen "required exhibits," including: policies, student and faculty orientation materials, use statistics, collection statistics, assessment measures to determine the adequacy of holdings and services to support the educational programs both on and off campus, computer usage statistics related to retrieval of library resources, comprehensive budgets for library and information resources.

Standard 2. Educational Program

also has two relevant statements:

"2.A.3. Degree and certificate programs demonstrate a coherent design...synthesis of learning, and the assessment of learning outcomes; and require the use of library and other information resources."

"2.A.8. Faculty, in partnership with library and information resources personnel, ensure that the use of library and information resources is integrated into the learning process."

subsection "Graduate Faculty and Related Resources"

"2.E.1. The institution provides evidence that it makes available for graduate programs the required resources for faculty, facilities, equipment, laboratories, library and information resources wherever the graduate programs are offered and however delivered."

Standard 2G. Continuing Education & Special Learning Activities

"2.G.5. Programs and courses offered through electronically-mediated or other distance delivery systems provide ready access to appropriate learning resources and provide sufficient time and opportunities for students to interact with faculty."

Policy on Distance Delivery of Courses, Certificate, & Degree Programs

contains a "Library and Information Resources" section:

"j. The institution ensures that students have access to and can effectively use appropriate library resources.

	k. The institution monitors whether students make appropriate use of learning resources. l. The institution provides laboratories, facilities and equipment appropriate to the courses or programs."
Southern (1998)	**Standard 5.1. Library and Other Learning Resources** Very prescriptive; use of "must"; fairly detailed about specific services and resources. Examples follow. "5.1.1. Purpose and Scope of Library and Learning Resources. The library and other learning resource must be evaluated regularly and systematically to ensure that they are meeting the needs of their users and are supporting the programs and purpose of the institution. 5.1.2. Services. Each institution must ensure that all students and faculty have access to a broad range of learning resources at both primary and distance learning sites. Basic library services must include an orientation program designed to teach new users how to access bibliographic information and other learning resources.…Librarians must work cooperatively with faculty and other providers in assisting students to use resource materials effectively.…Convenient, effective access to electronic bibliographic databases, whether on-site or remote, must be provided when necessary to support the academic programs. 5.1.3 Library Collections. Institutions offering graduate work must provide library resources substantially beyond those required for baccalaureate programs. 5.1.4 Information Technology. The institution must provide evidence that it is incorporating technological advances into its library and other learning resource operations. 5.1.5 Cooperative Agreements. 5.1.6 Staff. 5.1.7 Library and Learning Resources for Distance Learning Activities. The institution must own the library/learning resources, provide access to electronic resources available through existing technologies, or provide them through formal agreements." **Standard 5.3. Information Technology Resources and Systems** "5.3. There must be a reasonable infusion of information technology into the curriculum so that students exit with the fundamental knowledge and basic ability to use these resource in everyday life….A reliable data network should be available so that students, faculty, and staff may become accustomed to electronic communication and familiar with accessing national and global information resources." **Other relevant standards:** **Section 4: Educational Program. 4.3. Graduate Program** "4.3.1. An institution must provide a competent and productive faculty, adequate library and learning resources, adequate computer and laboratory facilities…." "4.3.4. ...A doctoral degree program must include a substantial period of residence to provide student access to a wide range of support facilities, including a research library, cultural events...." **Distance Education: Definition And Principles: Policy Statement**

	subsection "Library and Learning Resources" (1997; updated May 2000) "The institution ensures that students have access to and can effectively use appropriate library resources. The institution monitors whether students make appropriate use of learning resources."
Middle States (1994)	**Eligibility Criteria** "17. The institution provides sufficient learning and information resources and services to support the nature, scope and level of the programs offered." **Standard: Library and Learning Resources. Access and Utilization** Standards are not numbered and are in prose style, but the paragraphs can be summarized as follows: 1st two paragraphs discuss purpose, goals, and scope of library and learning resources. 3rd paragraph describes access to "a broad range of learning resources at both primary and off-campus sites.... A variety of contemporary technologies for accessing learning resources and instruction in their use should be available." 4th paragraph relates to "fostering optimal use through strategies designed to help students develop information literacy." 5th paragraph describes access to remote information resources via ILL and resource sharing or through formal cooperative agreements and networks. 6th paragraph makes it clear that the selection of materials should be a collaborative effort of teaching faculty, librarians and other information providers. 7th paragraph details the role of librarians to "demonstrate their professional competence on the basis of criteria comparable to those for other faculty and staff." It also describes their role in teaching information skills. 8th paragraph describes library buildings "in making an attractive place for study, research and teaching. Nothing else matters if resources are not used." 9th paragraph discusses evaluation of all learning resources, on-site or elsewhere. "A system for assessing the effectiveness...should focus on utilization, accessibility, availability, and delivery of materials. Quality and relevance of the collections, effectiveness of reference and referral services, and adequacy of funding for resources and their use are essential. Ultimately, the most important measure will be how effectively students are prepared to become independent, self-directed learners." **Educational Program and Curricula** 7th paragraph: "Institutions where graduate instruction and research constitute a major part of the overall program, recognition must be given to the extended demands placed on faculty, finances, facilities, library and other resources."
North Central (March 2001)	**Eligibility Criteria** Educational Program 18. It provides its students access to those learning resources and support services requisite for its degree programs. **Standards Criterion 2: Human, Financial, and Physical Resources** "j. Academic resources and equipment (e.g., libraries, electronic services and products, learning resource centers, laboratories and studios, computers) are adequate to support the

	institution's purposes." **"Principles of Good Practice in Adult Degree Completion Programs"** "Resources: The institution ensures access to learning resources, technology, and facilities to support its adult degree completion programs."
Southern (March 2001 draft)	**Eligibility Criteria. Core Requirement 9** "The institution provides and supports student and faculty access and user privileges to adequate library collections as well as to other learning/information technology and information resources consistent with the degrees offered, and they are sufficient to support all educational, research, and public service programs." **Comprehensive Standards. Section IV. Programs. subsection "Library and Other Learning Resources"** (one of the four "Programs") "30. The institution provides facilities and instructional support services for the library and other learning/information technology resources that are appropriate to its courses or programs and adequate to support its mission and its effectiveness for learning. 31. The institution ensures that users have access to regular and timely instruction in the use of the library and other learning/information technology and information resources. 32. The institution ensures a sufficient number of qualified staff with appropriate education or experiences ... to accomplish the mission of the institution." **Section IV. Programs. subsection "Educational Programs"** "14. The institution's use of technology enhances student learning, is appropriate for meeting the objectives of its programs, and ensures that students have access to and training in the use of technology."
WASC (January 2001)	**Eligibility Criteria** "17. The institution holds or otherwise provides long-term access to sufficient information and learning resources to support its purposes and all of its educational programs. To supplement these resources beyond the core library of the institution there may be specific long-term written arrangements for student access to readily available resources. Programs are in place to train students in the use of library and other information resources and to develop information literacy skills. The institution must also be able to demonstrate that library use is a fundamental part of curricula." **Standard 2. Achieving Educational Objectives through Core Functions. subsection "Teaching and Learning"** "Criterion 2.3. The institution's expectations for learning and student attainment are clearly reflected in its academic programs and policies. These include the organization and content of the curricula, its admissions and graduation policies, the organization and delivery of advisement, the use of its library and information resources...." **subsection "Support for Student Learning"** "Criterion 2.13. Student support services—including financial aid, registration, advising, career counseling, computer labs, and library and information services—are designed to meet the needs of the specific types of students the institution serves and the curricula it offers."

	"Question for Institutional Engagement To what extent does the institution provide an environment that is actively conducive to study and learning, where library, information resources, and co-curricular programs actively support student learning?" **Standard 3. Developing and Applying Resources and Organizational Structures to Ensure Sustainability. subsection "Fiscal, Physical, and Information Resources"** "Criterion 3.6. The institution holds or provides access to information resources sufficient in scope, quality, currency and kind to support its academic offerings and the scholarship of it members. For on-campus and students enrolled at a distance, physical and information resources, services and information technology facilities are sufficient in scope and kind to support and maintain the level and kind of education offered. These resources, services and facilities are consistent with the institution's purposes and are appropriate, sufficient, and sustainable. Criterion 3.7. The institution's information technology resources are sufficiently coordinated and supported to fulfill its educational purposes and to provide key academic and administrative functions." "Question for Institutional Engagement To what extent do the institution's resources, services and information technology respond to faculty needs with respect to scholarly activity and curricular development?"
Middle States (February 2001 draft)	**Eligibility Criteria** "17. The institution provides sufficient learning and information resources and services to support the nature, scope and level of the programs offered." **Standard 4. Institutional Resources** "An accredited institution is characterized by recognition in the comprehensive plan that facilities, such as libraries and other learning resources, which are fundamental to all educational and research programs, are adequately supported and staffed to accomplish the institution's objectives for student learning, both on campuses and at a distance." **Standard 10. Educational Programs** "Fundamental Elements: learning resources, library services, and professional library staff support adequate to support the institution's educational programs; collaboration between professional library staff and faculty in teaching and fostering information literacy skills relevant to the curriculum and to faculty research; programs that promote student use of information and learning resources." **Standard 12. Branch Campuses, Additional Locations & Other Instructional Sites** "Supplemental Analysis and Documentation: analysis of the adequacy and appropriateness of library/information and other learning resources." **Standard 12. Specialized Educational Activities—Distance or Distributed Learning** "Fundamental Elements: available, accessible, and adequate learning resources (such as libraries or other information resources) appropriate to the programs offered at a distance." "Supplemental Analysis and Documentation: evidence of how the institution assures that

	students and faculty have sufficient technological and information literacy skills to access and use effectively the information resources available at a distance."

ASSOCIATION
OF RESEARCH
LIBRARIES

21 Dupont Circle
Washington, DC 20036

BEST COPY AVAILABLE

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

ERIC

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title:
Measures For Electronic Resources (E-Metrics), Complete Set

Author(s):

Corporate Source:
Association of Research Libraries

Publication Date:

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents	The sample sticker shown below will be affixed to all Level 2A documents	The sample sticker shown below will be affixed to all Level 2B documents
PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 1	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2A	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2B
Level 1	Level 2A	Level 2B
☒	☐	☐
Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) and paper copy.	Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only	Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, → please

Signature: Lee Anne George

Printed Name/Position/Title:
Lee Anne George,
Publications Program Officer

Organization/Address:
Association of Research Libraries
21 Dupont Circle, NW, Suite 800, Washington, DC 20036

Telephone: 202-296-2296 ext. 130

FAX: 202-872-0884

E-Mail Address: leeanne@arl.org

Date: 7-30-2003

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:

Address:

Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:

Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
4483-A Forbes Boulevard
Lanham, Maryland 20706

Telephone: 301-552-4200
Toll Free: 800-799-3742
FAX: 301-552-4700
e-mail: info@ericfac.piccard.csc.com
WWW: http://ericfacility.org

EFF-088 (Rev. 2/2003)